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A Model of Reenlistment Decisions of Army National Guardsmen

Burke K. Burright, David W. Grissmer, Zahava D. Doering

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→ An econometric model of reenlistment decisions for Army National Guardsmen is developed using data collected from 2976 surveys. The surveys were administered to Guardsmen with less than 9 years of service who were making a reenlistment decision during 1979. The results of the model shows that a 10 percent increase in reserve pay would bring only a 2 percent increase in reenlistment rates. Since almost all Guardsmen are moonlighters, higher civilian job wage levels and hours worked bring lower reenlistment rates. Demographic composition and education level significantly affect reenlistment rates. Other things equal, women, blacks, and those who do not complete high school have higher reenlistment rates than their counterparts. Overall, the model predicts that reenlistment rates will more than double after 1978, thanks to a favorable demographic composition and the absence of draft motivated reservists. (See also R-2864-NRAL and R-2865-NRAL.)

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PREFACE

This report presents an econometric model of reenlistment decisions made by Army National Guardsmen. It was prepared as part of Rand's Manpower, Mobilization, and Readiness Program, sponsored by the Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics)--OASD (MRA&L). The Rand program seeks to develop broad strategies and specific solutions for dealing with present and future defense manpower problems. The research was conducted for the Office of Reserve Affairs under Task Orders 79-III-1, 80-III-1, and 81-III-1, Reserve Forces Manpower.

The reenlistment model was constructed from survey data collected during the 1978 Selected Reserve Reenlistment Bonus Test. The test, initiated as part of an effort to stem a severe decline in Army Selected Reserve strength, consisted of offering a bonus to reservists with less than eight years of service who faced a reenlistment decision in 1978. The Rand Corporation helped to design the test, monitored its implementation in the Army Reserve and National Guard, evaluated the effects of the bonus offer, and developed an econometric model of the reenlistment decision.

This report, the third of five publications documenting the Rand analyses of the 1978 Selected Reserve Reenlistment Bonus Test, models the reenlistment decision and summarizes the factors underlying a reservist's decision to separate or reenlist. The 1978 Selected Reserve Reenlistment Bonus Test: Executive Summary, R-2864-MRAL, April 1982, summarizes this and the second report, The Design, Administration, and

Evaluation of the 1978 Reenlistment Bonus Test, R-2865-MRAL, July 1982, which describes the effect of the bonus on reenlistment. Data Bases for the 1978 Selected Reserve Reenlistment Bonus Test, N-1826-MRAL, forthcoming, contains the technical documentation for the data bases used for all the analyses. A Follow-up of Participants in the 1978 Selected Reserve Reenlistment Bonus Test, N-1880-MRAL, forthcoming, analyzes the attrition of the test sample 3-1/2 years after the test began.

SUMMARY

Following termination of the draft in January 1973, the number of enlisted personnel in the Army Selected Reserve components--the Army Reserve and Army National Guard--declined for four successive years. Reserve ranks, which stood at 638,000 in June 1973, numbered only 527,000 in September 1978. Although this decline was later reversed, it raised serious concerns in the mid-1970s about the viability of the Selected Reserve in the All-Volunteer Force (AVF).

Under the total force policy, the success of the AVF depends on a strong reserve supporting a smaller, less rapidly expandable active force. The failure of the Selected Reserve to meet strength goals, it was believed, might endanger the entire AVF concept. Such drastic solutions as a return to the draft were proposed in Congress, because at the time the decline was not understood and the effect of various policies to boost strength was not known. In particular, the relationship between reserve pay and reserve force manning had never been established.

One hypothesis held that the effect of pay raises on reservists had been overestimated by AVF planners, and it was suggested that the measurement of pay effects might help to explain the decline and provide the basis for the formulation of policies to restore strength. If in a test reservists responded well to higher pay, monetary incentives would be used as the primary means of rebuilding reserve strength. If reservists responded poorly, other, possibly less expensive, solutions could be sought before a commitment was made to pay incentives.

This report describes the results of an experiment that in fact helped to explain the decline of reserve strength and provided a basis for estimating the costs and effectiveness of pay incentives to reverse that decline. The research was undertaken in response to a 1977 congressional authorization of \$5 million to evaluate the effect of a bonus on reenlistment in the Army National Guard and Army Reserve. In carrying out this experiment, Rand collected survey data from individual reservists who were deciding whether to reenlist. Thus, in addition to evaluating the effectiveness of a reenlistment bonus, Rand developed a model to test hypotheses concerning a reservist's motivation for remaining in service or separating.

The Rand research sought both to determine the influence of reserve pay on reenlistment decisions and to test a model of reservists as moonlighters. Moonlighting labor market theory suggests that certain characteristics of the primary job--wages and hours worked--affect moonlighting decisions. It predicts that higher primary job wages and longer working hours will deter moonlighting. In addition to reserve pay and civilian job wages and hours, Rand also analyzed the effect on reenlistments of both demographic and reserve job characteristics.

Data on reserve behavior were obtained from 2876 surveys returned by Army National Guardsmen who made a reenlistment decision during 1978. These guardsmen constituted part of the control group for the 1978 Selected Reserve Reenlistment Bonus Test. They had enlisted mainly between 1970 and 1975. The 1978 reenlistment decision was either a first reenlistment decision after the completion of an initial 3- or 6-year term or a second reenlistment decision after a 1-year first

reenlistment contract. All guardsmen in the sample were nonprior service personnel; that is, none had served in the active force before joining the National Guard. They came from seven states--Idaho, Iowa, New York, North Carolina, Pennsylvania, South Carolina, and Washington--states chosen as representative of the nation as a whole on the basis of economic and National Guard retention characteristics.

Reserve pay increases proved to affect retention much less than predicted during the planning of the All-Volunteer Force. Whereas the Gates Commission had assumed elasticities of 2.0 for draft-motivated first termers, .8 for first termers not motivated by the draft, and .3 for members with 6 to 10 years of service, we found an elasticity of .18 for a group of reservists divided roughly equally among the three groups. We found also that reserve pay added only an average of 7 percent to our sample reservists' average annual after-tax income. Although the typical reserve pay of those in the sample was \$1400, the net annual amount after deducting the costs of participation, lost civilian pay, and taxes was only \$725.

Since the financial incentive had been adopted as the primary means of attracting an all-volunteer force, the finding that the pay increase influenced retention less than expected accounted for part of the significant manning decline of the Selected Reserve after the draft ended. Stabilizing reserve strength in the AVF would have required much larger pay incentives.

Other things equal, higher levels of civilian wages and hours worked resulted in statistically significant lower reenlistment rates. A 10 percent change in civilian wages or hours worked brings a 2 or 3 percent change, respectively, in reenlistment rates. While the

direction and significance of these variables confirm the hypothesis that reservists behave as predicted by the moonlighting model, the magnitude of the effects is very small and several other variables in our model have more weight and higher elasticities than the moonlighting variables. This suggests that the reserve reenlistment decision is more complex than the simple decision suggested by moonlighting labor theory and that certain assumptions inherent in moonlighting labor theory may hold only weakly for reservists.

Reserve reenlistment decisions depend more on variables describing the uniqueness of the reserve job or the characteristics and previous experience of the potential reenlistee than on variables identified by moonlighting labor market theory. For instance, the unique requirement of reserve service for occasional full-time participation (annual training, etc.) usually involves absence from civilian work, thus making reserve participation dependent on the civilian employer's acquiescence. We found this dependence to be highly significant in the reenlistment decision. The efforts of the reserve community to enlist employer support appear to be directed at an important problem. Employer attitudes matter when reenlistment decisions are considered.

The previous military experience and circumstances of original enlistment proved important determinants of reenlistment. Individuals with low draft lottery numbers who enlisted in the reserve to avoid being drafted into the active force reenlisted at much lower rates than volunteer enlistees. This finding helps explain the relatively low reenlistment rates in the Army Reserve components through 1978, the last year in which draft-motivated personnel were making first-term reenlistment decisions. The reserve will experience a substantial increase in first-term reenlistment rates under the volunteer system.

Other things equal, promotion to a higher pay grade strongly influences the decision to reenlist. Guardsmen and reservists who achieved higher pay grades reenlisted at significantly higher rates than those who did not. Part of this effect may be accounted for by self-selection; part is probably due to the status that comes with higher positions. Membership in voluntary and fraternal organizations--including the reserve--also provides a kind of status.

Other things equal, personnel in combat jobs reenlist at slightly lower rates than those in noncombat jobs. This difference probably reflects the risk and other characteristics of combat jobs, the nontransferability of skills, and the poorer future promotion prospects associated with combat units.

Finally, the demographic composition and education of the reenlisting cohort significantly affect reenlistment. Other things equal, older reservists reenlist at much higher levels than younger reservists. Given that most reservists cite family and employer conflict as the main reasons for leaving the reserve, the higher retention rate of older reservists probably reflects an increase in stability between enlistment and reenlistment. A typical younger reservist in our sample enlisted at the age of 20 and made the reenlistment decision at 27, by which time he may have taken a job, married, and had children; such a reservist would be less likely to reenlist.

Other things equal, women, blacks, and those who did not complete high school reenlist at higher rates than their counterparts. The differences probably reflect somewhat poorer and more uncertain future

economic prospects. This finding points to even higher volunteer era reenlistment rates, as cohorts approaching reenlistment will contain more women and blacks and somewhat older, less-educated personnel.

Our research led to the following conclusions:

- o AVF reserve reenlistments will more than double after 1978 because (1) volunteers will replace draft-motivated enlistees, who usually do not reenlist, and (2) these volunteers will be more likely, on the basis of social and economic characteristics, to reenlist.
- o Pay increases will only marginally raise reenlistment rates above this volunteer level.
- o The higher retention rates after 1978 will eventually create a surplus of career reservists, a surplus that will, in turn, allow larger reserve force size, greater selectivity, and/or fewer prior service enlistments.

Our empirical results confirmed almost all of the hypotheses concerning the significance and signs of variables derived from moonlighting labor market theory. However, they also showed that reserve reenlistment decisions are not very sensitive to these variables. Explaining reserve reenlistment decisions requires--in addition to moonlighting variables--factors that capture certain unique aspects of the reserve job. Among these factors are the requirement for occasional full-time participation, certain qualitative aspects of reserve service, and reserve benefits. Additional work is needed to extend moonlighting theory to include these factors and to develop empirical models with better measures of these variables.

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I. INTRODUCTION

THE SELECTED RESERVE IN THE ALL-VOLUNTEER FORCE

The success of the All-Volunteer Force (AVF) under the total force policy depends on a strong reserve supporting a smaller, less rapidly expandable active force. The Army Selected Reserve thus assumes a larger share of the defense burden than it had carried under the draft. Following the termination of the draft in 1973, however, the number of enlisted personnel in the Army Selected Reserve components--the Army Reserve and the Army National Guard--declined for 4 successive years. Reserve ranks, which stood at 638,000 in June 1973, numbered only 527,000 in September 1978. The failure of the Selected Reserve to meet strength levels, it was feared, might endanger the entire AVF concept.

Manning the selected reserve had been relatively easy during the draft. Many young men holding low draft lottery numbers had enlisted in the reserve to avoid being drafted into the active service. Reserve units even had queues waiting to join. When the draft ended, however, reserve units had been forced to compete in the local civilian labor market for volunteers. For many units, the local labor market had failed to provide enough volunteers, and reserve manning had steadily fallen to below authorized strength, ultimately triggering congressional recommendations for a return to the draft.

Such drastic solutions as a return to the draft had been proposed because, at the time, neither the reasons for the Selected Reserve's decline nor the effect of various policy changes on reserve enlistments and reenlistments had been measured. It was suggested, however, that with the institution of the volunteer system, reserve strength--unlike

active Army strength--had fallen, because the AVF planners had overestimated the effect of reserve pay increases.

The Gates Commission, which planned the transition to the AVF, had recommended raising entry level pay for both active duty personnel and reservists to levels calculated to attract enough volunteers to replace draftees and draft-motivated enlistees. These calculations were supported by research, conducted in the 1960s, which quantified supply effects and predicted that pay raises for the active force would effectively increase both enlistments and reenlistments.[1] Pay elasticities of 1.25 for active force enlistments and of 2.8 for first-term reenlistments were assumed. Similar research was not available, however, to support estimates for the reserve forces.

Members of the Gates Commission, while recognizing that a key difference existed in the labor markets from which individuals were recruited for the active and reserve forces (namely, the full-time vs. secondary or moonlighting labor market), nevertheless assumed that reservists would respond almost as well as active force personnel to higher enlistment pay. Lacking data on which to base enlistment pay elasticities, they assumed an upper bound of 1.25, as for active force enlistment, and a lower bound of 0.8. Based on a 1968 survey, they estimated reserve reenlistment pay elasticities for three groups: 2.0 for draft-motivated first termers with 4 to 6 years of service, .8 for volunteer first termers with 4 to 6 years of service, and .3 for reservists with 6 to 10 years of service. These retention elasticities were significantly lower than those estimated for the active force.

[1] See Alan E. Fechter, "Army Enlistments," and Gary R. Nolson, "Army Reenlistments," in Studies Prepared for the President's Commission on an All-Volunteer Armed Force, U.S. Government Printing Office, Washington, D.C., November 1970.

Because the original pay elasticities were not based on behavioral data or on a sound theory of reserve participation, their validity was questioned. Some manpower specialists believed that actual elasticities might be much lower than those assumed. In fact, the Gates Commission had recommended caution in their reserve planning:

Analysis of the Reserve problem, however, suffers seriously from a lack of data. Even though special care was taken to provide against error of estimation, the assessments of what is required to maintain an All-Volunteer Force are much more tenuous than for the Active Force. . . . Given the uncertainty which surrounds projections of Reserve enlistments and losses, further steps beyond the recommended pay increase may be necessary. Any further steps should await the results of experience with higher pay during the first few years.[2]

Had the commission's assumptions concerning pay been accurate, the strength of both the active and reserve forces should have reached or exceeded the predicted AVF levels, since junior enlisted personnel in both forces benefited from pay increases that exceeded the commission's recommendations. Any shortages would likely have shown up first in Army strength levels, because youth prefer the Army least of all the armed services, while it has the greatest demand for manpower. The 1971 and 1972 pay increases had close to the predicted effect on active Army accessions, and enlisted strength did not decline.[3] They apparently

[2] Report of the President's Commission on an All-Volunteer Armed Force, U.S. Government Printing Office, Washington, D.C., 1970.

[3] Several measurements of the effect of pay increases have been made since 1972. For a review of enlistment studies, use Alan E. Fechter, "Review of the Literature: Some Methodological Issues," in Dorothy M. Amey, Alan E. Fechter, Daniel F. Huck, and Kenneth D. Midlam, Econometric Models of Armed Forces Enlistment Levels, General Research Corporation, McLean, Virginia, October 1976. For a review of reenlistment studies, see Winston K. Chow and J. Michael Polich, Models of the First-Term Reenlistment Decision, The Rand Corporation, R-2468-MRAL, September 1980.

See also David W. Grissmer, "The Supply of Enlisted Volunteers in the Post-Draft Environment: An Analysis Based on Monthly Data, 1970-1975,"

had a smaller effect than predicted on reserve enlistments and reenlistments. The effect could not be measured, however, because of the lack of good data at the time of the 1971 and 1972 pay increases.

The effectiveness of pay in attracting reservists was questioned again in 1977, when programs to reverse the reserve strength decline were considered. A reliable measurement of the effect of pay would determine the kind of policies needed to rebuild reserve strength. If in a test reservists responded well to higher pay, this could serve as the primary incentive for rebuilding reserve strength. If they responded only weakly, other, less expensive solutions might be sought before a commitment was made to increase pay incentives.

In 1972, Rostker and Shishko sought to explain the moonlighting behavior of Air Force reservists.[4] Their theory portrayed the moonlighting decision as a trade-off between leisure time and income from a second job. They identified several important economic variables in a moonlighting decision, including the wages and hours of the primary job and wages of the secondary job. Empirical estimation of civilian moonlighting decisions confirmed the direction and importance of these variables. Moonlighting was less frequent among those whose primary job was characterized by high wages and long hours.

in Richard V. L. Cooper (ed.), Defense Manpower Policy: Presentations from the 1976 Rand Conference on Defense Manpower, The Rand Corporation, R-2396-ARPA, December 1978; Richard V. L. Cooper, Military Manpower and the All-Volunteer Force, The Rand Corporation, R-1450-ARPA, September 1977; and Richard L. Fernandez, Forecasting Enlisted Supply: Projections for 1979-1990, The Rand Corporation, N-1297-MRAL, September 1979.

[4] Robert Shishko and Bernard Rostker, "The Economics of Multiple Job Holding," American Economic Review, Vol. 66, No. 3, June 1976, adapted from Rostker and Shishko, Air Reserve Personnel Study: Volume II. The Air Reserve Forces and the Economics of Secondary Labor Market Participation, The Rand Corporation, R-1254-PR, August 1973.

Rostker and Shishko's most important finding for reserve compensation policy was that a 10 percent increase in secondary wages would result in a 9 percent increase in the probability of moonlighting. If civilian moonlighting decisions and reserve participation decisions are analogous, then reserve pay elasticities around 1.0 would seem reasonable. This estimate, in fact, was not dissimilar to the assumption made by the Gates Commission in evaluating enlistment and retention effects.

In 1977, a congressionally authorized test of reenlistment bonuses for the Army National Guard and Army Reserve provided the opportunity to study the reserve reenlistment decision. Although Congress sought mainly to determine the effect of bonuses on reserve reenlistment, the bonus experiment presented the opportunity to collect data and test a broad range of hypotheses concerning reserve reenlistment behavior: for instance, the effect of raising reserve pay on retention and the relationship between participation in the reserve and the reservist's civilian job and labor force status.

Data to support a model of reserve participation were collected on a survey instrument administered to bonus test participants--members of the Army Reserve and Army National Guard who were making a reenlistment decision in 1978. The survey was administered at some time during the 3 months preceding the end of the reservist's term of service (ETS). Participants were later tracked to determine whether they had separated or reenlisted.

This report describes the analysis of this survey data and develops an economic model of the reserve retention decision which quantitatively

estimates the effect on reenlistment rates of reserve pay, civilian and military job characteristics, family and demographic characteristics, and military background. The remainder of this section describes the design, administration, and results of the 1978 Selected Reserve Reenlistment Bonus Test. Section II presents a rudimentary theory of reserve population, and Section III categorizes a population sample, drawn from the 1978 bonus test, in terms of variables identified as important in the retention decision. Section IV gives the results of our estimated model, and Section V tenders the policy implications of these results.

THE 1978 SELECTED RESERVE REENLISTMENT BONUS TEST[5]

In fall 1977, Congress appropriated \$5 million to test reenlistment bonuses in the Army National Guard and Army Reserve. The authorization bill specified not only the total test authorization, but also the amount, form, and timing of bonus payments to be tested, and the eligibility requirements for bonus recipients. Bonuses of \$1800 were offered for a 6-year reenlistment and \$900 for a 3-year reenlistment, one-half (\$900 or \$450) to be paid at the time of reenlistment and the remaining amount in \$150 installments at the completion of each obligated year of service. A repayment clause obligated a reservist who failed to complete the reenlistment contract to return a portion of the bonus payment. Reservists committing themselves for fewer than 3 years were not eligible.

[5] For a more detailed description of the experimental design and results of the test, see David W. Grissmer, Zahava D. Doering, and Jane Sachar, The Design, Administration, and Evaluation of the 1978 Reenlistment Bonus Test, The Rand Corporation, R-2865-MRAL, July 1982.

The bill specified several further eligibility requirements: Only reservists with fewer than 10 years (later cut for budgetary reasons by Department of Defense regulation to 8 years) of service were eligible. In addition, only nonprior service (NPS) personnel--that is, personnel who had not served in the active force prior to joining the reserve--were eligible.[6] Finally, only reservists whose term of service ended between January 1 and December 31, 1978, were eligible.

Since nonprior service reservists usually serve an initial 6-year term,[7] the bonus targeted reservists who were making their first reenlistment decision after serving an initial 6-year term or those who had completed an initial 6-year term, had reenlisted for 1 year, and were making a second reenlistment decision.

To permit the evaluation of the bonus effect, the test was experimentally designed to include bonus and control regions. Bonuses were offered to National Guardsmen in six states and to reservists in four Army Reserve regions. Each state or region was matched with one in which bonuses were not offered (see Table 1) on the basis of estimates of past retention behavior and the economic character of the region. The aggregate characteristics of test and control regions were also matched closely to national characteristics so that the results could be extrapolated.

[6] This provision eliminated over one-half the reservists who met all other requirements for bonus eligibility. The congressional rationale for this exclusion was based on differences in retention rates between the two groups--the nonprior service personnel had much lower retention rates than prior service personnel.

[7] The sample of eligible reservists contained 15 percent who had served a 3-year initial term. Currently, only women are allowed to enlist for a 3-year term; from 1973 to 1975, however, an experimental 3-year term was also offered to men. Thus, the sample contained both male and female 3-year enlistees.

Table 1

DISTRIBUTION OF ANALYTIC POPULATION IN BONUS
AND CONTROL AREAS, BY COMPONENT

Bonus Area	No. of Participants	Control Area	No. of Participants
United States Army National Guard			
Kansas	641	Iowa	835
New Jersey	1081	New York	1660
Michigan	972	Pennsylvania	1733
Georgia	732	North Carolina	1084
North Dakota	277	Idaho	297
Oregon	639	Washington	432
West Virginia ^a	0	South Carolina	911
Total	4342	Total	6952
United States Army Reserve			
94th ARCOM ^b and 76th Training Division ^b	845	79th ARCOM ^b and 99th ARCOM ^b	1748
Connecticut		Pennsylvania	
Maine		Ohio	
Massachusetts		West Virginia	
New Hampshire			
Rhode Island			
Vermont			
96th ARCOM ^c	478	89th ARCOM ^c	437
Colorado		Kansas	
Idaho		North Dakota	
Montana		Nebraska	
New Mexico		South Dakota	
Utah			
Wyoming			
205 Infantry Brigade ^d	177	157 Infantry Brigade ^b	213
Iowa		Pennsylvania	
Minnesota			
Wisconsin			
187 Infantry Brigade ^b	121		
Massachusetts			
Total	1621	Total	2398

^a West Virginia withdrew before the test began.

^b Part of the First Army.

^c Part of the Sixth Army.

^d Part of the Fifth Army.

Approximately 15,000 reservists in the test and control regions met the eligibility conditions and constituted the experimental sample. Of these, almost 75 percent were in the National Guard. Guardsmen predominated over Army reservists, first, because Congress had allocated \$3 million to the Guard and only \$2 million to the Army Reserve to conduct the test, and second, the Army Reserve has higher retention rates than the Guard, so that fewer Army reservists could participate even if budget allocations were equal.

The reenlistment decision of each of the approximately 15,000 reservists in the sample was monitored. These administrative data were combined with demographic and military background information collected from computerized personnel files to evaluate the effect of the bonus by a statistical comparison of behavior in bonus and control areas. The information from the computerized files was used to control for small differences in the composition of the test and control groups.

As a by-product of the bonus analysis, the effects of certain demographic and military background variables were also measured. Ideally, data from the survey instrument[8]--which contained more detailed demographic and military background variables, as well as variables on reserve compensation, civilian labor force, and employer characteristics--would also have been combined in this analysis and the effects of these variables obtained simultaneously with the bonus effect. However, survey responses were received from less than one-half of the sample, and those returning surveys were not representative of the entire sample.

[8] The survey administrative procedures and survey instrument are described in Appendixes B and C.

Because less than half the sample returned completed questionnaires, the data were analyzed in two parts. The first analysis, essentially a bonus program evaluation, used data from personnel records and administrative test data from all participants to evaluate the effects of the bonus and of the limited set of demographic and military background characteristics available from personnel files.[9] The second analysis, presented in this report, used survey data from an unbiased subset of test participants to estimate a more complex model of reserve retention behavior.

RESERVE PAY ELASTICITY AND THE 1978 BONUS TEST RESULTS

The bonus evaluation did not unambiguously settle the important question of the responsiveness of reservists to monetary incentives. The bonus increased reenlistment rates from 38.4 percent to 40.6 percent, representing a 5 percent increase, a much smaller effect than expected. That expectation, however, was based on a simple present value calculation and an assumed reserve pay elasticity.[10] The bonus raised reserve gross income during the 3- or 6-year terms by between 20 and 25 percent. Based on an assumed secondary or moonlighting wage elasticity of 1.0,[11] an increase in reenlistment rates of 20 to 25 percent had been predicted.

[9] This analysis was reported in David W. Grissmer, Zahava D. Doering, and Jane Sachar, The Design, Administration, and Evaluation of the 1978 Reenlistment Bonus Test, The Rand Corporation, R-2865-MRAL, July 1982.

[10] See Appendix A.

[11] The reserve reenlistment pay elasticity had not previously been measured. However, Shishko and Rostker measured the secondary wage elasticity for civilian moonlighting job decisions at close to 1.0.

Three possible explanations of the small bonus effect were considered. First, the value of the reserve pay elasticity may be much lower than 1.0, perhaps because the decision to take a civilian moonlighting job may differ from the decision to enlist or reenlist in the reserve.

Second, the bonus evaluation itself may have been flawed. For example, reenlistment decisions in control areas may have been affected by the anticipation of a future bonus; that is, the 1978 bonus test may have heightened expectations of members of the control group for bonuses in succeeding years. This effect may have led to an underestimation of the bonus effect.

Third, a pay raise and bonus may differ essentially, and the assumptions used in the simple model translating a bonus into an effective pay raise may have been wrong. The bonus was expected to bring a smaller response than a pay raise because of (1) the requirement to accept a longer term of commitment and (2) the temporary nature of the bonus. Because a bonus is paid only during the term of service in which it is accepted, it does not represent a permanent pay increase, nor does it enter into the reserve base pay used to calculate future pay increases and retirement pay levels.

The reserve pay elasticity therefore had to be measured so that the bonus results could be interpreted. A low measured pay elasticity would have supported the bonus measurement and the hypothesis of a generally low responsiveness of reservists to monetary incentives. A high measured pay elasticity would have indicated either a flawed bonus measurement or a basic difference in bonus payments and pay raises.

II. A THEORY OF RESERVE PARTICIPATION

This section develops a simple model of the reserve reenlistment decision. The model draws from a model of civilian moonlighting behavior to identify factors that may relate to the reservist's decision and suggests how they are likely to influence that decision. Factors that set reserve participation apart from moonlighting are also discussed.

A SIMPLE MODEL BASED ON CIVILIAN MOONLIGHTING THEORY

Because the reserve offers limited working hours, it attracts moonlighters (men and women with full-time jobs) rather than those who want to work only part time. More than 93 percent of the reservists in the 1978 reenlistment bonus test were moonlighting, while less than 7 percent were working only part time (see Table 2). Reservists work a total of 204 hours a year,[1] much less than the average of 960 hours a

Table 2

PRIMARY ACTIVITY DURING THE MONTH OF THE REENLISTMENT DECISION

Activity	Percentage
Full-time work	91.1
Part-time work	2.2
Unemployed	2.9
Education	2.2
Housekeeping	0.9
Other	0.7
Total	100.0

[1] The 204 hours involve two quite different kinds of participation: Monthly drills require 16 hours of work, usually during

year worked by part-time jobholders,[2] or the median of 700 hours a year worked by moonlighters on second jobs.[3] Thus, someone who wanted to work only part time clearly would be better off with a civilian job-- unless significant differences existed between civilian and reserve wages and benefits.

Although the typical civilian second job offers the moonlighter the opportunity to earn more money, individual taste and differences in civilian and reserve monetary and nonmonetary benefits may make the reserve job more attractive. For this reason, the reserve job may compete better in the moonlighting labor market than in the part-time labor market. Like a primary job, a second or part-time job involves both monetary and nonmonetary benefits and costs. Just as a person considers the entire package of benefits and costs when deciding on his primary job, he also considers the entire package in considering a second job.

While recognizing that reserve participation involves an entire package of benefits and costs, we start with a simplified model of the reenlistment decision involving only two elements of the package: reserve pay and time costs. Deferring our discussion of the entire reserve package until later allows us to build on the standard model of the civilian moonlighting decision and to focus on the interaction between the reservist's civilian and reserve jobs. We examine first the

a single weekend; annual training requires 14 days of full-time work, usually for 2 consecutive weeks during the summer.

[2] Employment and Earnings, Vol. 26, No. 5, May 1979, Table A-27.

[3] Multiple Jobholders in May 1978, U.S. Department of Labor, Bureau of Labor Statistics, Special Labor Force Report 221, Table I.

effects of changes in four variables: reserve pay, reserve participation time requirements, primary job pay, and primary job time requirements.

Assumptions of the Model

Our model of the reserve reenlistment decision is based on the assumptions that reserve participation constitutes a second job, represents a choice between distinct alternatives, and involves one-way reversibility. The assumption is also made, but later dropped, that the reservist knows exactly his civilian job hours and earnings.

A Second Job. As shown in Table 2 (above), 93 percent of the reservists in our sample worked either full or part time; only 3.8 percent engaged in activities outside the labor force, such as going to school or keeping house. We therefore analyze the reenlistment decision in terms of the choice of continuing to hold a second job. This means that we must account for how the attributes of the reservist's primary job affect his reenlistment decision.

A Choice Between Alternatives. Reservists must sign a reenlistment contract for a minimum term of 1 year. Thus, in reenlisting, the reservist commits himself to devoting a specific amount of his time to reserve participation for at least the next year. In facing the reenlistment decision, he must either accept or reject that commitment. In short, he must decide between two discrete alternatives.[4]

[4] Looking at the reenlistment decision as a choice between alternatives distinguishes this study from Shishko and Rostker's analysis of the supply of second job labor. They assumed that a person must work a fixed amount of time on his primary job, but that he may work the amount of time that he prefers on a second job. These assumptions focus the analysis on how much time the individual chooses to work on his second job and permit the use of calculus. In analyzing the choice as one between alternatives, we cannot use calculus to construct our model but we must fall back on geometric methods.

One-Way Reversibility. Most second or part-time jobs, being transitory, do not involve long-term labor contracts. In contrast, the reserve requires a commitment for at least 1 year. Without this commitment, the idea of both the availability of the reserve for rapid mobilization and of the reenlistment decision itself loses meaning. But, if a reservist chooses not to reenlist, he does not automatically preclude future reserve participation; he is simply indicating that he does not consider committing himself to another year of reserve participation to be in his best interest at that time. We can therefore focus on the current costs and rewards of reserve participation as key determinants of the reservist's decision.

Certainty. We also assume at first that our representative reservist knows how much money he will earn from his civilian job during the next enlistment period, how many hours he will spend on his civilian job, how much money he will net from reserve participation, and how much additional time reserve participation will require. After we develop the basic model, we will drop the assumption of certainty about civilian job hours and earnings.

Factors Affecting the Basic Reenlistment Decision

Our initial characterization of the basic reenlistment decision is depicted in Fig. 1. The reservist's entire available time during the year is indicated along the horizontal axis. He devotes a part of his time to his civilian job; we assume that he must work a fixed number of hours on that job. He also spends time on reserve activities. Part of the time spent on reserve activities might be offset by a reduction in the time that he would have to spend on his civilian job; another part

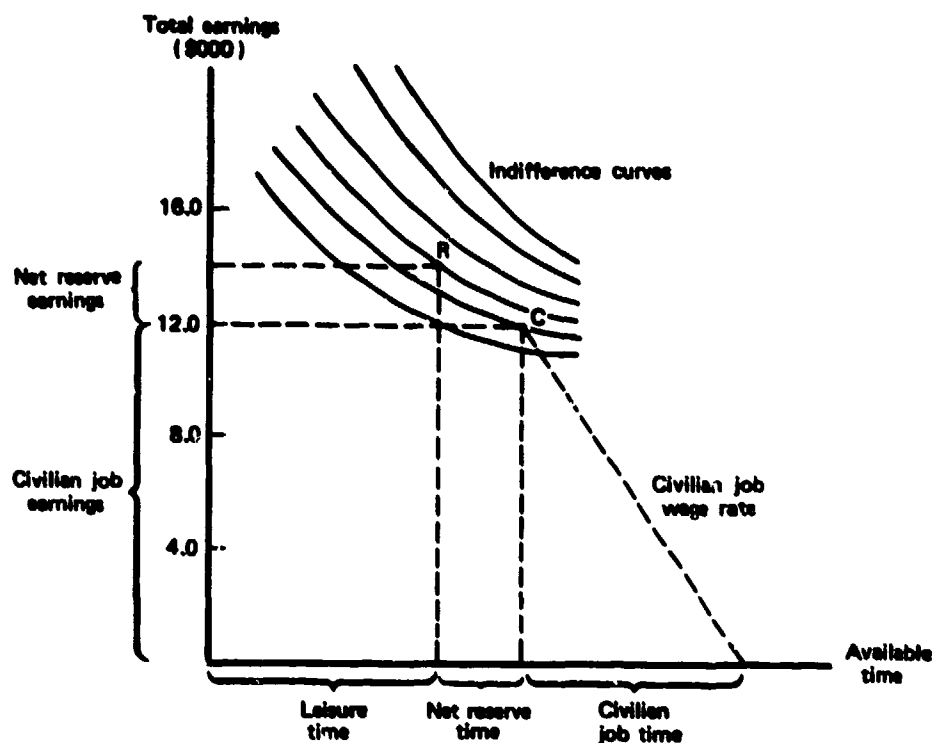


Fig. 1 -- The basic reenlistment choice

represents a reduction in his leisure time. The reduction in leisure time constitutes the net time costs of reserve participation.

The reservist's earnings are indicated along the vertical axis of Fig. 1. Our representative reservist earns about \$12,000 a year from his civilian job. He also earns a second income from his reserve participation. Like his reserve time, his reserve earnings are represented on a net basis; they are reduced by any loss in civilian earnings due to summer camp attendance. The reservist's total earnings, then, equal the sum of his civilian job earnings and his net reserve earnings.[5]

[5] Income that the reservist does not have to work for--so-called nonwage income--was omitted from the figure for simplicity. Had it been included, all the dashed lines would have been shifted upward by the amount of the nonwage income.

We assume that the reservist's well-being depends on his money earnings and leisure time. The indifference curves in Fig. 1 indicate all the combinations of money income and leisure time that could make the reservist equally well off. The farther the curve from the origin, the higher the level of well-being. An indifference curve sloping downward to the right indicates that a reservist is always ready to sacrifice some amount of total earnings for another increment in leisure time. It is also clear that if the reservist's well-being remains unchanged, he would give up less income for each successive increase in leisure time; in other words, the subjective value for the reservist of an additional hour of leisure time falls as his hours of leisure time increase.

Our representative reservist faces a simple choice. As he completes his term, he is at point R in Fig. 1; if he reenlists, he remains there. If he separates, he moves to point C, where he earns less total income but has more leisure time. Our reservist will choose the alternative that makes him better off; as the diagram is drawn, he will be better off if he reenlists. But, had the structure of the reservist's preferences been such that point C was associated with a higher indifference curve than point R, the reservist would have been better off separating.

Net Reserve Pay. The effect of a decrease in net reserve pay on our representative reservist's choice is shown in Fig. 2.[6] Such a

[6] The figures are drawn on the assumption that the reservist earns less per hour from reserve participation than from his primary job. Although a few reservists in our sample might earn more per hour, this does not make any difference for most of the model's implications; only those stemming from changes in hours spent on the primary job would matter. When we take up this change, we will point out the difficulties.

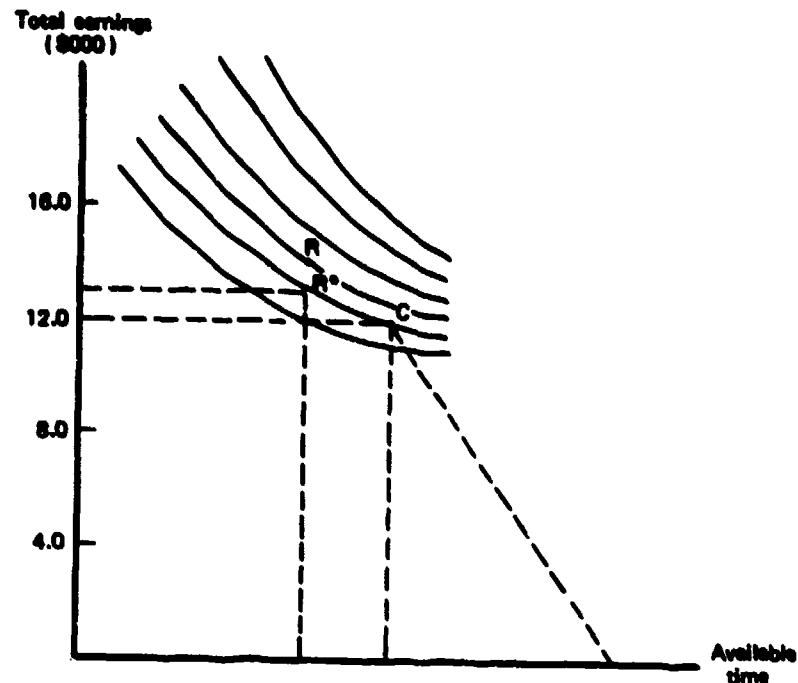


Fig. 2 -- Effect of lower net reserve pay
on reenlistment choice

decrease would occur, for example, if his employer stopped granting him leave with pay to attend summer camp. It would also occur over time if reserve pay failed to keep up with inflation. In this case, the representative reservist would have to choose between R^* and C. With the reduction in net reserve pay, he would be better off at point C, which would mean separating. His net reserve pay would no longer suffice to keep him in the reserve.

The reduction in net reserve pay implicit in the shift from R to R^* is sufficient for our representative reservist to decide to leave.

Other reservists would decide that while they were not as well off as they had been, they were still better off in than out of the reserve. Whether a reservist decided to remain or to leave would depend on how many hours he had to spend on his civilian job, how much his civilian job paid, and how much extra time he had to spend on reserve activities. His response to lower pay would depend also on how much he valued earnings over leisure: Each reservist values earnings and leisure in his own subjective way.

As long as reservists value both more income and more leisure, none who would have separated before net reserve pay was reduced will remain after it has occurred. If the reservist is better off separating when net reserve pay is higher, he will still be better off separating when it is lower. So, it is impossible for a reduction in net reserve pay to lead to an increase in reenlistments; it must always lead to a decline. Our simple model leads to a clear initial hypothesis: The relationship between net reserve pay and the fraction of reservists that reenlist is positive.

Net Reserve Time. Figure 3 illustrates the effect of a net increase in the time required for reserve participation on our representative reservist's decision. In reality, there are few "pure" net increases or decreases in reserve time; most occur along with some other change. One example of a pure increase in reserve time results from an employer's illegal decision not to grant summer military camp leave with full pay. Such a change would force the reservist to use vacation time to attend summer camp; summer camp attendance would thus increase his annual work time, but his total money income would not fall.

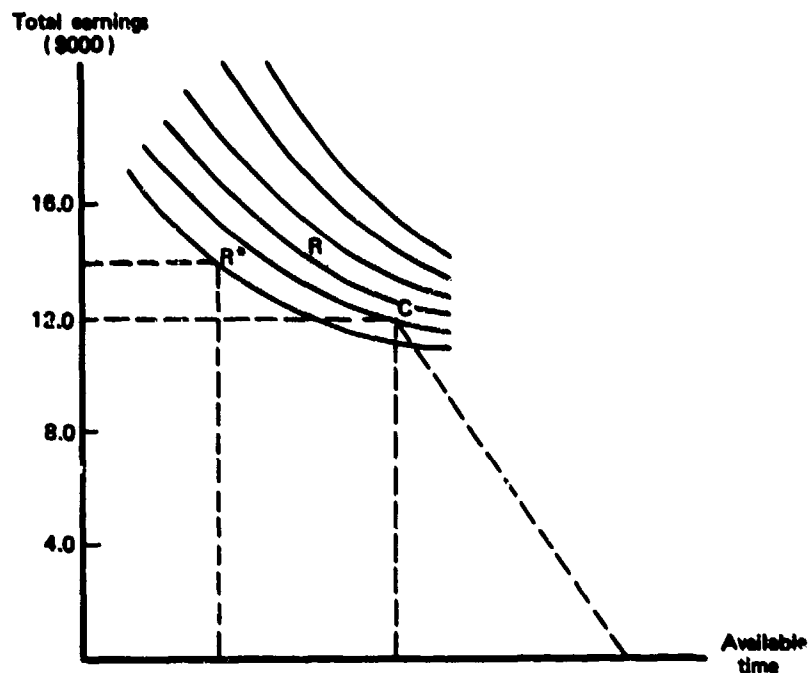


Fig. 3 -- Effect of greater net reserve time on reenlistment choice

As Fig. 3 is drawn, such an increase in net reserve time would be enough to cause our representative reservist to decide to separate. But, a net increase in reserve participation time would not persuade anyone who already had decided to separate to remain. A net increase in reserve participation time would lead only to the decision to separate. Again, we have a clear initial hypothesis regarding the direction of the relationship.

Civilian Wage Rate. The reservist's civilian job wage rate also affects his reserve participation. One outcome of an increase in civilian earnings is portrayed in Fig. 4. The initial effect of the wage increase is to shift points R and C upward by the amount of the

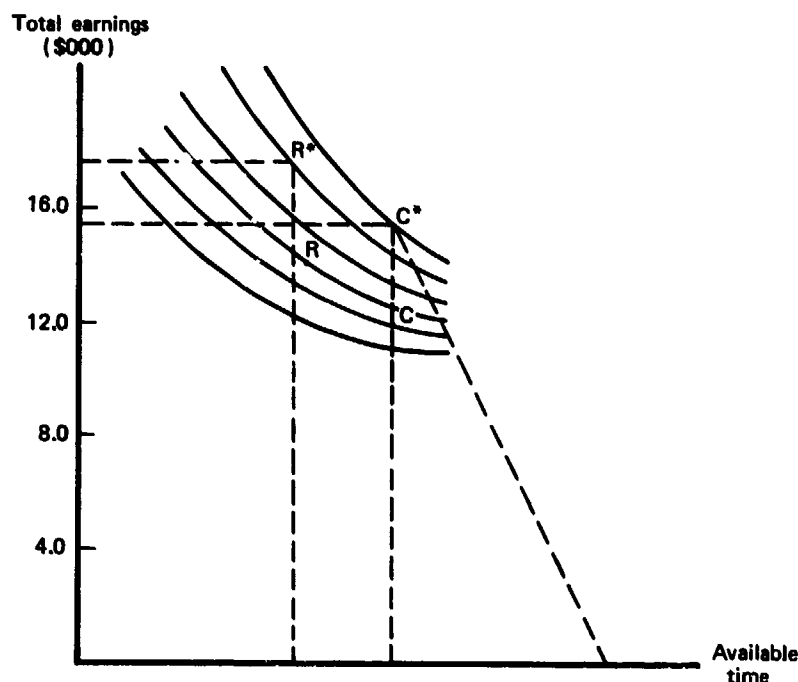


Fig. 4 -- Effect of higher civilian wage rate on reenlistment choice

annual earning increase. The reservist would now have to choose between R^* and C^* . As Fig. 4 is drawn, he would be better off at point C^* and would separate. To remain in the reserve after the increase in his civilian wage rate, the reservist would have had to receive a substantial increase in net reserve pay.[7] Of course, even with a

[7] At point C^* , our representative reservist still values his last day of leisure time at less than his civilian wage rate. This is

civilian wage increase, some reservists would still feel that they were better off in the reserve and would reenlist. As long as both higher earnings and more leisure time are desired, however, none who would have separated at a lower wage rate would remain with a higher one. The next section, therefore, will deal with the strength of the negative relationship between the civilian wage rate and the proportion of reservists choosing to reenlist.

Civilian Job Hours. Figure 5 shows what would happen if our representative reservist had to work overtime or if his hours were reduced. Longer hours would shift his alternatives from R to R* and from C to C*. As Fig. 5 is drawn, he would be better off at C* and would separate. With longer hours on his civilian job and with a higher civilian income, the reservist would find that the extra income he received from reserve participation would no longer be worth the leisure time that he had to give up. Other reservists might continue to value the extra income more than the leisure time that they would give up; they would reenlist. No one who would have separated when his civilian job required less time will remain when it requires more.[8] So, we expect a negative relationship between time required on the civilian job and the propensity to reenlist.

represented in Fig. 4 by the indifference curve cutting the wage line from below point C*. Had the civilian job wage increase been even larger, the indifference curve would have cut the wage line from above. Then, the reservist would not take any additional work at a wage rate at or below his civilian job wage rate.

[8] If the implicit wage rate earned from reserve participation is higher than the wage rate earned on the primary job, one can construct cases in which a reservist who would have left the reserve with shorter hours on the primary job decided to reenlist with longer hours. For this result to occur, working more hours at the lower wage rate paid on his primary job must make the reservist worse off.

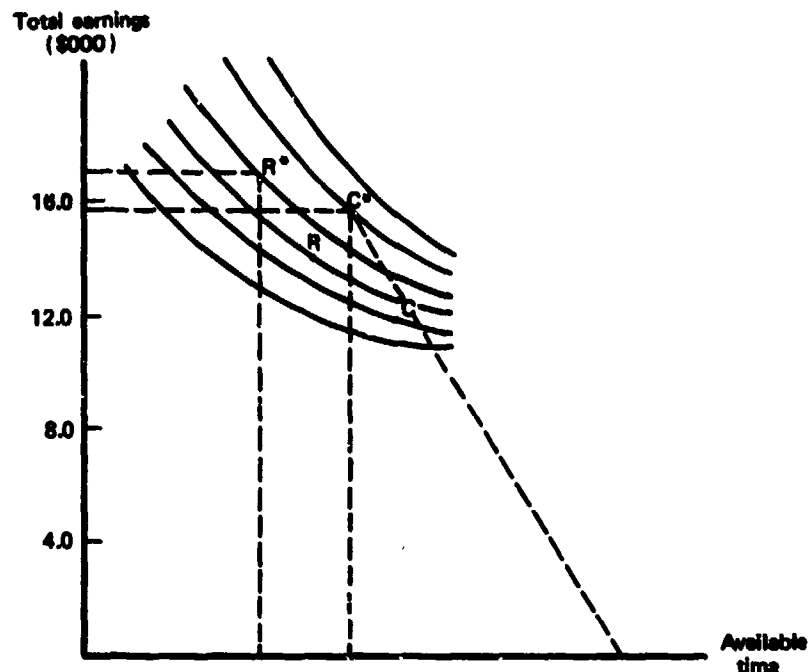


Fig. 5 -- Effect of longer civilian job hours on reenlistment choice

The Reservist's Uncertainty. We have assumed until now that our representative reservist knows exactly (1) how much time his civilian job will demand, (2) how much time a reserve commitment will require, (3) how much his civilian job will pay in the next year, and (4) how much he will earn from reserve participation. Some reservists can, in fact, predict their future time requirements and money earnings accurately; others must deal with much uncertainty in making their reenlistment decisions. The reservist may not know, for instance, how much he will earn from civilian employment in the next year or how many hours he will devote to it. In terms of the above diagrams, Fig. 1

shows his "normal" civilian job situation and Fig. 5 reflects the situation when he works overtime on that job; together, the two figures imply that he would choose to reenlist if the normal situation prevailed but would choose to separate if offered overtime all the time. So, the propensity of a reservist to reenlist is likely to relate negatively to how frequently he is offered overtime work on his regular job.[9]

Our uncertainty analysis applies also to unemployment. In terms of the two figures, unemployment means that both civilian job time and earnings are zero; reserve participation provides the person's only earnings when he does not have a civilian job. Our argument in the preceding paragraph implies that a reservist who fears the loss of his civilian job would be more likely to reenlist. In other words, it suggests that a reservist reenlists to provide a hedge against future unemployment.[10]

OTHER DETERMINANTS OF THE REENLISTMENT DECISION

Our model so far describes how the reservist's civilian job may affect his reenlistment decision, but it overlooks the several aspects of reserve participation that set it apart from other second jobs. We must therefore consider the additional factors that are likely to affect the reservist's reenlistment decision.

[9] The argument in this paragraph does not depend on a higher wage rate for overtime; higher overtime pay would, of course, reinforce the effect.

[10] The argument for reserve participation as a hedge against unemployment, which does not require a change in reserve time or pay, is reinforced by a second mechanism. As well as providing a permanent part-time job, reserve participation may also provide a temporary full-time job in the form of a return to active duty to receive additional training or to perform other special duties. The possibility of going on active duty provides another hedge against unemployment.

The Uniqueness of Reserve Participation as a Second Job

Parallels to reserve participation do not come easily to mind. Membership in a volunteer fire department or veteran organizations offers some of the same subjective aspects as reserve participation, but neither provides monetary compensation. At least five aspects of reserve participation set it apart from other second jobs and voluntary activities.

First, reservists must periodically spend full time on the reserve job. This full-time requirement, which often conflicts directly with primary job requirements, involves several aspects of training. Annual training requires 14 days of full-time work during the summer. Reservists who have had no active duty experience must train full time for at least 4 months. Advancement may also involve specialized, full-time training. Finally, reserve service may require full-time duty during threats to national security and call-ups for civil emergencies.

For reservists employed full time, full-time reserve duty means the interruption of the civilian job and the substitution of military for civilian earnings. This full-time obligation may conflict with the civilian employer's requirements and the reservist's civilian career aspirations. This obligation does not necessarily represent a cost to reservists, however, when it provides full-time employment to unemployed reservists and training useful on civilian jobs.

Second, the reservist must legally commit himself to at least 1 year and up to 6 years of service. In contrast, second jobs in the civilian economy usually do not require an employment contract specifying length of employment. For some reservists, such contracts

may provide secondary job security; for others, they represent an opportunity cost associated with reserve participation.

Third, reserve participation provides fringe benefits not offered by most second jobs in the civilian economy. Reservists obtain health, life insurance, education, tax, and pension benefits and may qualify for a cost-of-living-adjusted pension at the age of 60 after 20 years of satisfactory service.[11] Current education benefits pay for tuition and fees up to a lifetime total of \$1500. Reservists also may use post and service exchanges while on annual training.

Fourth, the reserve job may provide nonpecuniary rewards. The work itself often offers special equipment, training, and environments, as well as a feeling of comradeship and a sense of team accomplishment. Reserve participation seems to provide some of the same kinds of subjective rewards as membership in fraternal or service organizations.

Fifth, the quite inflexible reserve work schedule differs from the schedules of most moonlighting jobs. This inflexibility includes both the number of hours worked and the work schedule. Reservists are paid for either 8 or 16 hours per month, and no opportunity exists for increasing paid hours. These hours are usually scheduled on weekends, and drill attendance is mandatory with little flexibility for alternative work schedules. Annual training requires the interruption of full-time civilian employment with little flexibility to satisfy civilian employer scheduling concerns.

[11] A reservist must accumulate 50 points annually to achieve a year of satisfactory service. Reservists get 1 point for each day of annual training and each drill attended. In addition, 15 points are given annually for unit membership. Perfect attendance would merit 77 points. Pension payments are tied directly to total points accumulated.

The Reservist's Personal Situation

Our model of the reenlistment decision allows us to focus on and understand better some key determinants of the decision. The simplicity of the model, however, forces us to abstract from other important considerations. Here we focus on factors that are not included in our analytic model but that may affect a reservist's reenlistment decision.

The Reserve Military Role. Reserve participation does not provide the same experience for everyone. Reservists have different military jobs; some military jobs are less enjoyable or more dangerous than others. Also, a reserve unit constitutes a complex set of social relationships. Within a unit, reservists not only have different jobs but also different status. Both the nature of the reservist's military job and his status within the unit may affect his subjective satisfaction from participation and so, his propensity to reenlist. We will therefore include variables in our empirical analysis that reflect job context and rank.

Civilian Job Attributes. We portrayed the reservist's civilian job above as a simple exchange of his time for his employer's money. It is, of course, much more than that. His civilian job, like his reserve job, involves nonmonetary aspects that affect his well-being and safety. Some aspects of the reservist's civilian job do, and some do not, affect his reenlistment decision. Such aspects as the extent to which reserve participation conflicts with civilian work schedules, reduces the reservist's promotion potential, and irritates employers are likely to have a significant effect. We have tried to capture the interaction between reservist and employer with an attitudinal variable and civilian employer characteristics.

Working Spouse. Our simple model focused on the individual reservist, without taking into account the possibility that he may be married and that his spouse may have a job. A spouse's working may affect a reservist's reenlistment decision to the extent that it increases family income, requires a redistribution of household responsibilities, and raises the family's marginal tax rate, thereby reducing the reservist's after-tax earnings.

Changes in Situation Since Last Reserve Participation Choice. One fact distinguishes the members of our sample: Each has faced at least one prior reserve participation decision and decided that participation was in his best interest. Each one's decision to participate stemmed from the interactions of his preferences and the circumstances under which he made his last decision, that is, his choice situation. So, the reservists in our sample reflect, in part, the frequency with which different kinds of choice situations occurred in the past.

The choice situation that confronted a reservist in the more distant past may have differed from the one confronting him in 1978. For some in our sample, the alternative to working in a civilian job and participating in the reserve had been being drafted for active military duty. About 35 percent of our survey respondents had joined the reserve to avoid the draft. So, we must account for draft-motivated individuals among our survey respondents.

Moreover, the reservists in our sample were from 1 to 6 years removed from their last participation decision. The longer the interval, the more likely the change in their choice situations as a result of outside events. An example is a change of employer. Some

outside events increase the attractiveness of reserve participation; others diminish it. Analysis cannot tell us whether the cumulative effect of outside events on the choice situation is positive, neutral, or negative, or whether the absolute size of the cumulative effect increases as the interval lengthens. We know, however, that if there is a cumulative effect, it will change results through its influence on the composition of survey respondents and that we must take its effect into account.

Reservist's Personal and Locational Characteristics. The reservists in our sample differ with respect to age, race, sex, marital status, household size, location of residence, and many other personal characteristics. Such differences may or may not relate to their reenlistment decisions. A difference would be considered relevant if it systematically related either to a reservist's preference for leisure time and money earnings or to unobserved aspects of his choice situations. For example, we argued above that reservists who were more likely to lose their civilian jobs would be more inclined to reenlist. While we cannot observe directly the probability that a reservist is going to lose his civilian job, we can observe personal characteristics that might systematically relate to the probability. This argument suggests that blacks, women, high school dropouts, and members of other groups with high unemployment rates would be more likely to reenlist.

Such clear notions about how most personal and locational characteristics might affect reenlistment decisions are not available. Economic science can say little about differences due to systematic differences in preferences. We must therefore wait for the empirical analysis in Section IV to tell us whether a particular personal and

locational characteristic affects reenlistment decisions. We have pinpointed here several elements of the reservist's reenlistment choice set that are likely to be important to his decision. In Section IV we attempt to determine how important each is to his decision. Before we get to that issue, however, we see in Section III how some key elements vary within our sample population.

III. CHARACTERIZATION OF THE RESERVE SAMPLE IN TERMS OF THE FACTORS AFFECTING THE BASIC REENLISTMENT CHOICE

This section characterizes our sample of reservists in terms of both the factors included in our simple model and the other determinants of the reenlistment decision identified in Section II. It should be noted that the members of this sample differed from typical Army selected reservists in that the bonus test included only reservists who had no prior active service, less than 8 years in the reserve, and a reenlistment decision in 1978.

NET RESERVE PAY

A reservist's nominal yearly pay depends on his pay grade, his years of service, his marital status, his unit's number of authorized drills, and the length of his annual training. For example, a married reservist in pay grade E4, with 3 years of service, would have nominally received \$1183 in 1978 if his unit was authorized 48 drills and he attended 14 days of annual training; a reservist in E6 with 6 years of service would have nominally received \$1533. Drill pay represents a little more than 70 percent of gross annual pay; pay for annual training accounts for the rest.

Because a reservist may lose income from his civilian job when he attends annual training, the amount that he actually nets from reserve participation may be much less than his nominal pay. Net reserve pay equals nominal reserve pay only when (1) the reservist's employer allows him leave with full pay to attend annual training, (2) the reservist's employer does not allow leave to attend annual training and reservist must use regular paid vacation time,[1] or (3) the reservist does not

[1] Although employers have a legal obligation to provide military leave for annual training, our survey showed that 9.2 percent of

have a job during the training period. Net reserve earnings are less than nominal reserve pay if the employer allows leave without pay or pays only the difference between the reservist's civilian pay and his military pay.

Figure 6 gives the percentage of survey respondents subject to each kind of employer leave policy. This distribution of leave policy leads to a kind of natural pay experiment in which--other things equal--reservists are divided into three groups having different levels

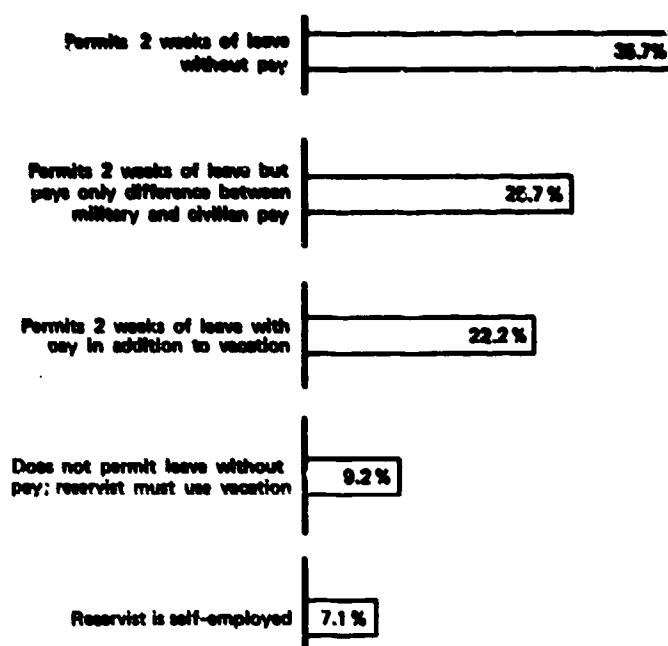


Fig. 6 -- Distribution of survey respondents by employer leave policy

reservists in the sample did not receive military leave for annual training.

of net pay determined by whether their employer provides full, partial, or no pay for summer training. The difference in net annual pay between full and no civilian pay depends on the civilian wage level, but for typical reservists amounts to over \$500, or roughly 60 percent of average net reserve pay.

Figure 7 shows a distribution of net annual reserve pay.[2] Those making less than \$700, for the most part, earn no civilian pay at

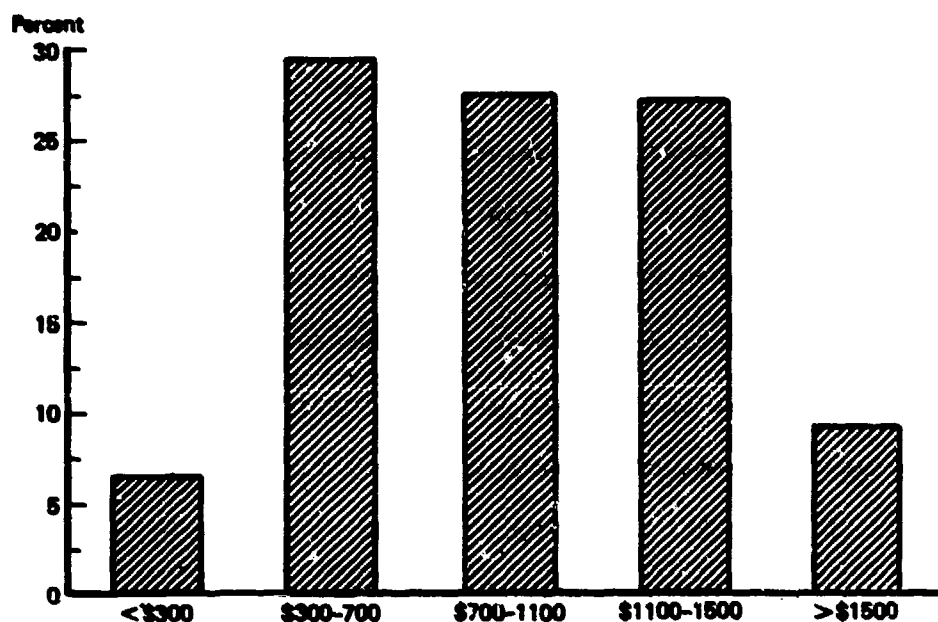


Fig. 7 -- Distribution of survey respondents by net annual reserve pay

[2] The data summarized in Fig. 7 contain an adjustment for differences in the cost of living among areas. This adjustment represents our attempt to express each reservist's net reserve pay in dollars of constant purchasing power so as to come even closer to the notion of net reserve pay used in the analytic section. In fact, all the variables expressed in monetary terms in this study have been adjusted for differences in the cost of living among areas. (See Appendix E.)

summer camp; those making between \$700 and \$1100 receive partial pay; and those receiving above \$1100 receive full pay.

NET RESERVE TIME

The concept of net reserve time represents the incremental work time that a reservist must put in during a year because he belongs to the Army Reserve or National Guard. It includes, for all reservists, the time devoted to traveling to and participating in monthly drills. For the individuals who must use vacation time to attend annual training or who are unemployed, it also includes summer camp time: If a reservist cannot offset his summer camp time by reducing his civilian job time, his net time cost of reserve participation is larger.

Figure 8 contains a distribution of net reserve time in terms of days per year. More than 70 percent of the reservists providing usable data put in an additional 22 to 26 workdays because they belonged to the Army Reserve or the National Guard; there is relatively little variation among reservists in terms of their net reserve time. Most of the reservists in this bracket (1) belonged to units that held 48 drills per year and (2) received leave to attend annual training; the others belonged to units that held 24 drills per year and were not given leave to attend training or were not employed. The remainder of the reservists were found at the extremes of the distribution. Those devoting less than 16 days per year to reserve participation were in 24-drills-per-year units and received leave to attend summer camp. Those who put in more than 34 days were in 48-drills-per-year units and did not receive leave or did not hold a civilian job.

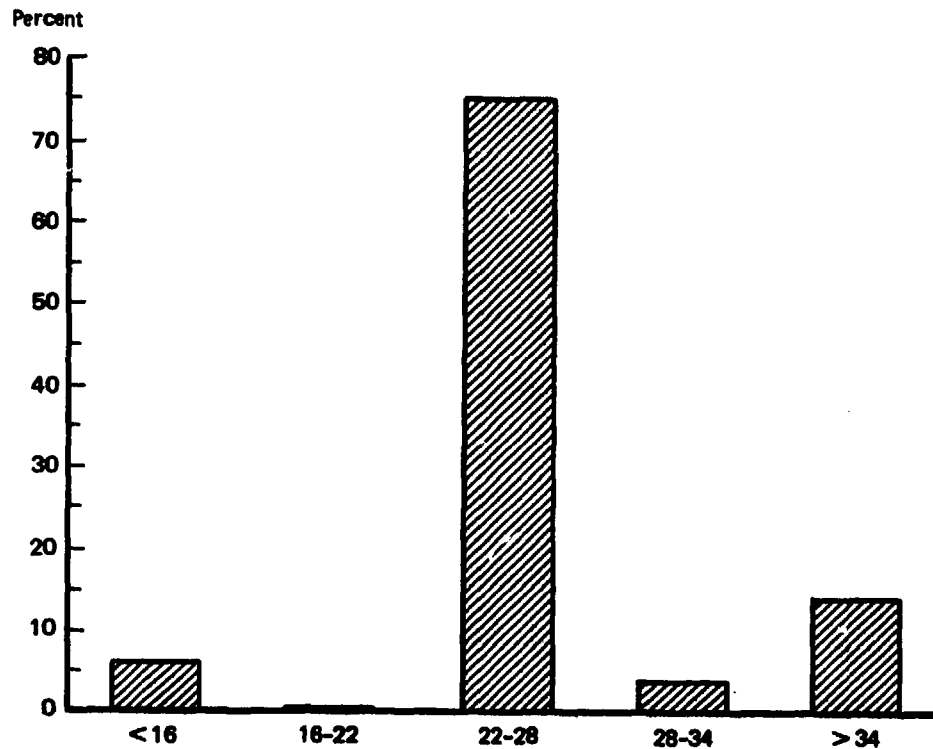


Fig. 8 -- Distribution of survey respondents by net reserve time (days per year) spent in reserve activities

CIVILIAN WAGE RATE

Our model of the reenlistment decision indicates that the wage rate of the reservist's civilian job affects reserve participation. We hypothesized that the higher the reservist's civilian wage, the less likely his reenlistment. Figure 9 shows the distribution of gross (pretax) hourly earnings for employed reservists. While the reservists' 1977 hourly earnings covered a wide range, more than 50 percent earned between \$4.50 and \$7.50, corresponding to annual earnings of \$9,000 to \$15,000.

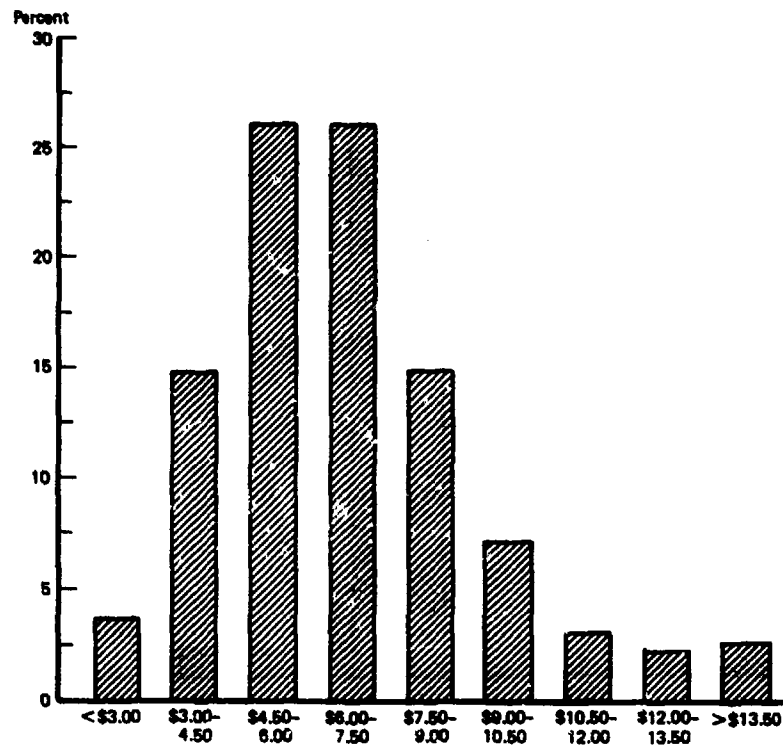


Fig. 9 -- Distribution of survey respondents by civilian hourly earnings

Table 3 compares reservists' annual earnings with those of like groups in the U.S. population. Reservists who were employed full time earned somewhat more than the average. The differences are most striking for blacks. The comparisons draw into question the notion of reservists as people with poor earning opportunities in the civilian economy.

Table 3
COMPARISON OF 1977 EARNINGS OF U.S. POPULATION
AND SURVEY RESPONDENTS^a

	Mean Earnings	
	U.S. Population ^b	Survey Respondents ^c
Males		
White	\$13,535 (120) ^d	\$14,978 (137)
Black	10,717 (322)	13,617 (707)
Females		
White	9,555 (74)	9,945 (360)
Black	9,178 (220)	9,816 (564)

SOURCES: U.S. Bureau of the Census, Current Population Reports, Series P-60, No. 118, "Money Income in 1977 of Families and Persons in the United States," U.S. Government Printing Office, Washington, D.C., 1979, Table 48; and tabulation of Rand survey returns.

^aThe U.S. population data, collected in March 1978, include 25- to 29-year old full-time workers; age is defined as age at last birthday. For the survey respondents, age is defined as 1 year less than age at 1978 date of end of term of service.

^bTotal money earnings of year-round, full-time workers.

^cAnnual earnings from primary job of full-time workers. See Appendix C for a description of how this variable is computed.

^dNumbers in parentheses represent standard errors.

CIVILIAN JOB TIME

Our model identifies civilian job time as another determinant of the reenlistment decision. Figure 10 provides a distribution of the hours usually worked per week by employed reservists. More than half of the employed reservists worked around 40 hours a week, and only a small

fraction worked less than 38 hours a week. About 30 percent worked from 43 to 52 hours a week; a little over 10 percent of the survey population put in longer hours.

FREQUENCY OF OVERTIME

We saw above that reservists might have to make reenlistment decisions in the face of uncertainty about some aspects of their civilian jobs. An important job-related uncertainty involves the availability of overtime work. Table 4 indicates that three-quarters of the reservists were certain about the availability to them of overtime; for them either it was available every week or it was never available.

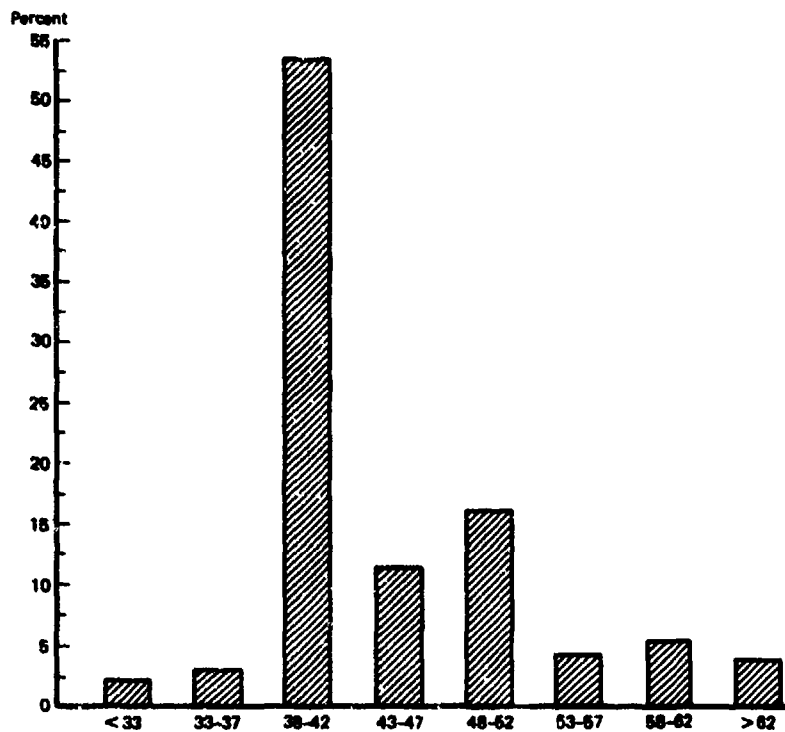


Fig. 10 -- Distribution of survey respondents by hours worked per week in civilian job

Table 4
AVAILABILITY OF OVERTIME AS PERCEIVED
BY RESPONDENTS^a

Frequency	Percentage
Every week	32.1
Every two weeks	7.5
Every month	7.3
Every two months	11.1
Never	41.9

^aSurveys with necessary information: 90.9 percent.

Another quarter of the respondents, in making their reenlistment decision, had to deal with some uncertainty about how frequently they would be offered overtime work.

RESERVE ROLE

Whether or not a reservist likes his reserve job affects the probability of his reenlisting. Two aspects of the reservist's military job are considered in this study: the nature of the job--32 percent of those surveyed had combat jobs; and the reservist's pay grade--four out of five of those providing useful surveys were E4s or E5s (see Table 5).

EMPLOYER'S ATTITUDE

We noted above the employer's attitude toward reserve participation as a qualitative aspect of the reservist's civilian job. Although this factor may be important to the reservist's reenlistment decision, it

Table 5

PERCENTAGE OF RESERVISTS
IN EACH PAY GRADE

Pay Grade	Percentage
E3 and below	4.4
E4	36.2
E5	46.4
E6 and above	13.0

could not be included in our simple model. Table 6 shows that about 45 percent of the reservists who responded saw their employers' attitude as positive; only 19 percent saw their employers' attitude as negative.

Table 6

EMPLOYERS' ATTITUDES TOWARD RESERVE
PARTICIPATION AS PERCEIVED
BY RESERVISTS

Attitude	Percentage
Very favorable	20.7
Somewhat favorable	24.2
Neutral	36.4
Somewhat unfavorable	12.7
Very unfavorable	6.3

WORKING SPOUSE

A working spouse may affect the reservist's reenlistment decision, on the one hand, by providing additional family income, and on the other hand, by creating a situation in which the reservist may have to devote more time to home activities. As can be seen from Table 7, slightly more than half the currently married reservists who answered the appropriate question had a working spouse.

PERSONAL CHARACTERISTICS

Personal characteristics can serve as proxy variables for missing economic variables and personnel taste. One such characteristic is age. Table 8 shows the age distribution of the survey respondents at the end of their term in 1978. Some 84 percent of the respondents were between 24 and 31 years old; almost two-thirds were between 24 and 27 years old. Because the survey focused on a narrow cross section of reservists, the results presented in Section IV cannot be generalized to other groups of

Table 7

EMPLOYMENT STATUS OF SPOUSE OF CURRENTLY MARRIED RESERVISTS^a

Employment Status	Percentage
Working full time	39.8
Working part time	13.0
Not working	48.2

^aSurveys with necessary information:
88.7 percent

Table 8
AGE OF SURVEY RESPONDENTS AT 1978
END OF TERM OF SERVICE

Age	Percentage
20 to 23	7.8
24 to 27	63.6
28 to 31	21.2
32 to 35	3.7
36 to 39	2.6
40 and over	1.1

reservists; they do not necessarily hold for either younger, less experienced reservists or older, more experienced ones.

The demographic characteristics of the sample (see Table 9) show a high proportion of married reservists and a relatively low percentage of women and blacks. However, almost all of our sample of reenlistees entered the reserve prior to 1975; since then, the proportion of both

Table 9
INDIVIDUAL CHARACTERISTICS
OF SURVEY RESPONDENTS

Characteristic	Percentage
Black	6
Female	11
Currently married	75
Not a high-school graduate	11
College graduate	21

women and blacks has risen. The high proportion of college graduates in the enlisted ranks--nearly one-third--represents young men who enlisted in the reserve to escape active duty in 1972, the last year of the draft.[3]

[3] Over three-fourths of 1972 enlistees had low lottery numbers, indicating probable draft motivation. See the lottery analysis, Appendix E, in David W. Grissmer, Zahava D. Doering, and Jane Sachar, The Design, Administration, and Evaluation of the 1978 Selected Reserve Reenlistment Bonus Test, The Rand Corporation, R-2865-MRAL, July 1982.

IV. A MODEL OF THE ARMY NATIONAL GUARD REENLISTMENT DECISION

This section presents a statistical model of the reservist's reenlistment decision that will enable us to predict the probability of reenlistment. The model will be used to estimate the relative importance of the characteristics described in Section II and to derive parameters that can predict the effect of policy changes on reenlistment rates.

The statistical model uses 2867 survey responses collected from National Guard personnel in the control areas of the 1978 Selected Reserve Reenlistment Bonus Test. Our reenlistment model was estimated on this sample rather than on the entire experimental sample because statistical comparisons of the populations returning and not returning surveys showed significant bias in the total sample but none in the Guard sample.[1] These statistical tests thus removed to a great extent problems often associated with estimates using survey data--namely, explicit bias due to survey nonresponse or an unknown bias due to lack of data for comparison between respondents and nonrespondents.[2]

[1] These statistical comparisons were made possible by linking social security numbers given on survey forms with those on the enlisted personnel records of all reservists in the original experimental sample. We could thus determine who did and who did not return a survey. Appendix D contains an analysis of bias introduced by the failure to respond to the survey for the full experimental sample. Comparisons of the reenlistment model estimated on the total experimental population and the National Guard control population are also presented.

[2] While the use of only the Guard/Control survey responses avoided survey response bias problems, it meant accepting two limitations on the analysis of the survey data. First, it precluded estimating with the survey data alone the effects of the bonus availability and of reserve component on reenlistment decisions. Second, it forced us to consider only the reenlistment decision and not the length of term chosen; without the incentive of a bonus to reenlist for a longer period, most guardsmen simply extended for one more year. These two questions were analyzed, however, using the administrative and

DEFINING AND ESTIMATING THE MODEL

The decision to reenlist in the reserve is defined by a dichotomous variable assuming the value of one for reenlistment and zero for separation. The conditional logistic regression (logit) model is an appropriate choice for the functional form since it restricts the value of the dependent variable to zero and one. This model relates the reenlistment decision of the i th individual, Y_i , to a vector of characteristics for that individual, x_i . The assumed relationship is:

$$Y_i = p(x_i) + \epsilon_i ,$$

where

$$p(x_i) = P[Y_i = 1 | x_i] = \frac{1}{1 + e^{-(\beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \dots + \beta_k x_{ik})}} ,$$

k denotes the number of characteristics measured for individual i , and $\beta_0, \beta_1, \dots, \beta_k$ are the parameters of the model to be estimated.

The model was estimated using both maximum likelihood estimators (MLE) and the discriminant function technique. The two methods yielded essentially the same estimates. The MLE estimates are presented here.

Table 10 describes the variables[3] used in the model and Table 11

personnel data collected in the experiment. See David W. Grissmer, Zahava D. Doering, and Jane Sachar, The Design, Administration, and Evaluation of the 1978 Selected Reserve Reenlistment Bonus Test, The Rand Corporation, R-2865-MRAL, July 1982.

[3] Appendix E contains the variable definitions from the survey questions. Missing data were handled by assigning a dummy indicator variable that assumes a value of one for missing data and of zero for available data (see Appendix F).

Table 10
DEFINITIONS OF MODEL VARIABLES

Reserve Pay and Time	
Annual net drill and camp pay (ANDSCP)	Annual net reserve pay adjusted to cost of living
Net reserve time (NRT)	Net annual reserve time
Reserve Experience	
Pay grade E3 or below (PG3)	Indicator variable = 1 when pay grade is E1 to E3
Pay grade E5 (PG5)	= 1 when pay grade is E5
Pay grade E6 (PG6)	= 1 when pay grade is E6
Pay grade E7 or above (PG7)	= 1 when pay grade is E7 or above
Combat job (COMJOB)	= 1 for combat military occupational specialty (MOS)
Years of service (YOS)	Total years of service in Army Reserve or National Guard
Revealed Reserve Preferences	
Draft motivation (IEA)	= 1 if reservist enlisted to avoid draft
Prior reenlistment (PA)	= 1 if reservist had previously reenlisted at least once
Civilian Work Environment	
Free time (FT)	Reservist's leisure time
Civilian hourly wage (CAWR)	Civilian hourly wage rate adjusted to cost of living
Availability of paid overtime (WPOA)	Number of weeks per year reservist can earn overtime
Must use vacation (ESCP)	= 1 when employer does not allow military leave for annual training
Employer's attitude (EA)	Perceived employer attitude toward reserve job on scale of 1 (least negative) to 5 (most negative)
Federal government employment (FG)	= 1 when reservist is employed by U.S. government
State/local government employment (SLG)	= 1 when reservist is employed by state or local government
Middle-sized-firm employment (MSPR)	= 1 when reservist is employed by firm of 100 to 500 employees
Small-firm employment (SPR)	= 1 when reservist is employed by firm of less than 100 employees
Self-employed (SE)	= 1 when reservist is self-employed
Spouse's annual earnings (SAE)	Earnings of spouse in 1977
Individual Characteristics	
Sex (SEX)	= 1 if reservist is female
Race (BLACK)	= 1 if reservist is black
Age (AGE)	Age of reservist
Married (MS)	= 1 if reservist is married
Number in household (NHH)	Number of people in reservist's household
Not high-school graduate (NHSD)	= 1 if reservist did not graduate from high school
College graduate (CG)	= 1 if reservist graduated from college
Regional Characteristics	
Middle-sized urban area (MC)	= 1 when reservist lives in city of 50,000 to 250,000
Small urban area (SC)	= 1 when reservist lives in city of less than 50,000
Rural area (RU)	= 1 when reservist lives in rural area
Suburban area (SUB)	= 1 when reservist lives in suburb of large city
1978/1977 local inflation factor (RIF)	Ratio of 1978 to 1977 local inflation factor

Table 11

COEFFICIENTS OF THE REENLISTMENT DECISION MODEL

Variables	Coefficient	t-Ratio
Reserve pay and time		
Annual net drill and camp pay	0.230×10^{-3}	1.66
Net reserve time	-0.470×10^{-3}	-0.04
Reserve experience		
Pay grade E3 or below	-0.561	-2.45
Pay grade E5	0.708	7.22
Pay grade E6	0.113×10	6.88
Pay grade E7 or above	0.293×10	2.72
Combat job	-0.341	-3.70
Years of service	-0.955×10^{-1}	-3.49
Revealed reserve preference		
Draft motivation	-0.607	-4.75
Prior reenlistment	0.879	7.05
Civilian work environment		
Free time	0.982×10^{-2}	2.05
Civilian hourly wage	-0.753×10^{-1}	-3.69
Availability of paid overtime	-0.441×10^{-2}	-2.08
Must use vacation	-0.301	-1.28
Employer's attitude	-0.249	-5.90
Federal government employment	-0.601×10^{-1}	-0.23
State/local government employment	0.307	1.59
Middle-sized-firm employment	0.862×10^{-1}	0.61
Small-firm employment	0.204	1.73
Self-employed	-0.247	-1.01
Spouse's annual earnings	-0.882×10^{-5}	-0.67
Individual characteristics		
Sex: female	0.690	2.37
Race: black	0.109×10	4.99
Age	0.655×10^{-1}	4.14
Married	-0.851×10^{-2}	-0.07
Number in household	0.576×10^{-1}	1.54
Not high-school graduate	0.207	0.51
College graduate	-0.499	-3.74
Regional characteristics		
Middle-sized urban area	-0.708×10^{-1}	-0.46
Small urban area	-0.109	-0.69
Rural area	-0.851×10^{-1}	-0.52
Suburban area	0.107	0.72
1978/1977 local inflation factor	0.125×10	0.32

Table 11

CONTINUED

Variables	Coefficient	t-Ratio
Missing value indicator variables (MVIV)		
Annual net drill and camp pay	-0.206	-0.83
Net reserve time	0.387	0.58
Draft motivation	-0.209	-0.26
Prior reenlistment	0.281	0.33
Free time	0.885	1.89
Civilian hourly wage	-0.557	-2.64
Availability of paid overtime	-0.384	-1.65
Must use vacation	-0.152	-0.52
Employer's attitude	-0.976	-3.30
Kind of employer	0.761	2.89
Spouse's income	-0.335	-1.73
Married	-0.202	1.98
Number in household	-0.202	-1.14
Education	-0.329	-1.59
Residential area	0.101	0.17
Intercept	-0.272 x 10	-0.75
Number of observations	2876	
Chi-squared	780.53	

the results of the model estimation. We now briefly describe the overall results and then discuss in more detail the results for each variable.

The coefficients of the model were usually consistent with the expectations of moonlighting labor market theory. In particular, other things equal, reenlistment rates tended to rise with net reserve income and to fall with higher civilian hourly wage rates and longer civilian hours. Moreover, the coefficients of the variables associated with the

civilian job wages and hours worked were all significant at the 5 percent level of confidence or lower, and the reserve income variable was significant at the 10 percent level. The estimated model provides important verification of the hypothesis that reservists behave somewhat similarly to civilian moonlighters in their consideration of factors important in the second job decision.

The results also showed consistency with expectation on variables associated with military characteristics, experience, and taste. Other things equal, reenlistment rates rose with higher pay grades and fell with combat military occupation specialties. All coefficients associated with the pay grade and occupational specialty variables were significant at the 2 percent level of confidence or better. Two highly significant variables (.1 percent level) measured taste for reserve participation through the circumstances of previous reserve participation decisions. As expected, reservists who held low lottery numbers at enlistment reenlisted at significantly lower than average rates, while those who had already reenlisted once reenlisted at higher than average rates.

The effect of demographic factors also generally followed expectations. Reservists with uncertain or poor future labor market prospects generally reenlisted at higher rates. Thus, other things equal, females, blacks, and less educated individuals reenlisted more frequently than their counterparts. These coefficients were significant at better than a 1 percent level, except for the sex variable, which was significant at the 5 percent level. Other things equal, being married did not affect participation, but reservists from larger families had somewhat higher reenlistment rates. Finally, other things equal, older

reservists reenlisted at a significantly higher rate than younger reservists.

The most significant variable associated with employer and job characteristics was the attitude of the reservist's employer toward reserve participation. Once this attitude and other job characteristics (wage, hours worked, overtime, etc.) were controlled, retention rates depended only weakly on the type of employer. Retention rates were slightly higher for reservists working for small private employers and state or local governments. Self-employed reservists reenlisted at lower rates.

Other things equal (including cost-of-living differences), the size of the community in which the reservists lived did not significantly affect the reenlistment decision. All variables reflecting the community size were statistically insignificant.

ANALYZING THE RESULTS

We turn next to the responsiveness of reenlistment rates to changes in demographic, economic, and reserve policy variables. In calculating responsiveness, we treat the dependent variable as continuous[4] and the independent variables as either continuous or dichotomous. When the independent variable can change continuously, we use an elasticity measure, an elasticity being the proportional change in the independent

[4] The more rigorous method of calculating changes in the dependent variable resulting from changes in the independent variable for dichotomous logit estimation is to estimate the average reenlistment probabilities across the sample under two values of a particular independent variable. This procedure is expensive when the sample and the number of respondent variables to be evaluated are large. We have used an approximation that is accurate as long as the value of the dependent variable is between .2 and .8. Since the average reenlistment rate is .5 for our survey sample, the approximation is adequate for this model.

variable divided by the proportional change in the dependent variable. We use the slightly different but parallel concept of proportional change to deal with dichotomous conditions. A proportional change associated with a zero/one variable is defined as the change in the dependent variable resulting from the change from zero to one divided by the mean value of the dependent variable.

For the continuous independent variable, elasticity is calculated as

$$\frac{\partial D}{\partial I} \frac{\bar{I}}{\bar{D}},$$

and for the zero/one independent variable, proportional change is calculated as

$$\frac{\Delta D}{\bar{D}},$$

where

- $\frac{\partial D}{\partial I}$ is the instantaneous rate of change in the dependent variable, D, with respect to the independent variable, I
- ΔD is the change in the dependent variable associated with a change in status
- \bar{D} is the mean value of the dependent variable for the experimental population
- \bar{I} is the mean value of an independent variable for the appropriate survey population.

Reserve Pay and Time Requirements

The analysis in Section II suggested that net reserve pay and net reserve time play a key role in a reservist's reenlistment decision. But, gross reserve pay and total reserve time are set through public policy, and while they are important determinants of net pay and net time, respectively, they are not the only determinants. After reviewing the effects of changes in net reserve pay and time costs, we relate the net changes to gross changes.

Annual Net Drill and Camp Pay. The possibility of estimating a reserve pay elasticity had been a major reason for collecting survey data during the experiment. In Table 12, we find the elasticity of the reenlistment rate with respect to net reserve pay to be 0.12. In other words, higher annual net drill and summer camp pay had a positive but small impact on reenlistments.

Table 12

ELASTICITIES OF THE REENLISTMENT RATE WITH
REGARD TO NET RESERVE PAY AND TIME COSTS
(Guard/Control Sample)

	Elasticity ^a
Annual net drill and training pay (pay grade unchanged)	^b 0.12
Net reserve time	-0.01

^aElasticities are evaluated at the mean reenlistment rate.

^bBased on a coefficient significant at less than the 10 percent level.

For the policymaker setting gross pay levels, our results may be expressed in terms of a gross pay elasticity by simply substituting average gross pay for average net pay in the elasticity expression.[5] The average annual net drill and camp pay for the individuals in our sample was \$871; average gross drill and summer camp pay was \$1300. Therefore, the elasticity of the reenlistment rate with respect to gross annual drill and summer camp pay is 0.18.

Reservists did not appear to be very responsive to increases in reserve pay, in part because reserve income constituted a quite small

[5] To show why we can substitute gross pay for net annual pay, we define the relevant expressions below. Let

- R stand for the reenlistment rate
- N stand for mean net annual reserve pay ($N \equiv G - L^*$)
- G stand for mean gross annual pay
- L^* stand for mean lost income from civilian job (assumed constant)
- $\frac{dR}{dG} \frac{G}{R}$ stand for elasticity of the reenlistment rate with respect to average gross annual reserve pay
- $\frac{dR}{dN} \frac{N}{R}$ stand for elasticity of the reenlistment rate with respect to average net annual reserve pay.

Now, noting that $dN = dG$ since L^* is constant,

$$\frac{dR}{dN} \frac{N}{R} \equiv \frac{dR}{dG} \frac{N}{R} \equiv \frac{dR}{dG} \frac{G}{R} \frac{N}{G} ,$$

which implies for elasticities evaluated as sample means that

$$\frac{dR}{dG} \frac{G}{R} = \left(\frac{dR}{dN} \frac{N}{R} \right) \frac{G}{N} .$$

proportion of their income. For the typical reservist in our sample, the net annual after-tax reserve income represented only 7 percent of total annual after-tax income. Our analysis shows that a 25 percent increase in reserve pay would raise total family income by 2 percent and that reenlistment rates would change from 38.4 to 40.1 percent. Clearly, large changes in reserve pay would be required to markedly affect both family income and retention rates.

While reserve income is a small component of total family income, the time and other potential costs of reserve participation may at times seriously conflict with civilian job and/or family activities. For reservists with such conflicts, small increases in reserve pay are unlikely to alter a decision not to reenlist. Since such conflicts constitute the most frequently cited reasons for leaving the reserve (see Table 13), a small pay elasticity is not surprising.

Net Reserve Time. Our discussion of the reenlistment decision in Section II suggests that we must consider not only the pay earned by attending monthly drills and summer camp but also the time costs of attending. Just as we noted above the incremental increase in a reservist's income resulting from his participation, we note here the incremental time resulting from participation. Based on survey data (see Table 12, above), we estimated net reserve time elasticity at -0.01, indicating that differences in net reserve time had a negative but negligible effect on reenlistment. The absence of a strong effect, however, may be due to the small degree of variation in the sample.

Table 13

REASONS FOR LEAVING GIVEN BY SEPARATING RESERVISTS
RETURNING 1978 BONUS TEST SURVEYS

Reason	Percentage
Conflict with family on leisure time	31.6
Conflict with civilian job	30.8
General dislike of military	11.4
Dislike of unit's training practice	7.1
Not eligible for 1978 reenlistment bonus	4.5
Moving to take a new job	2.9
Insufficient pay	2.0
Disagreement with personnel and pay policies	1.9
Job transfer	1.9
Distance to reserve unit	1.7
Conflict with education	1.7
Fear of call-up or mobilization	.8
Extra income not needed	.6
Health	.6
Not eligible to reenlist	.5

The Reserve Role

As we pointed out in Section II, how much a reservist enjoys participating in the reserve may hinge on his military job, his status in his unit, and other factors. Here we look at how differences in nonmonetary aspects of participation affect the propensity to reenlist. The lack of data limited our ability to examine all of the ways in which differences in the qualitative aspects of participation affect reservists' reenlistment decisions. Our analysis focuses on only two aspects: rank and type of military job.

Pay Grade.[6] According to Table 14, reservists with higher rank showed a much greater propensity to reenlist. Moreover, this result is

[6] A statistical test (described in Appendix G) indicated that a reservist's pay grade has a strong effect on his reenlistment decisions--an effect that extends beyond the increase in net reserve pay. We therefore included the pay grade variables in our base equation.

statistically highly significant. We must interpret this result carefully, however, because it is not clear that a simple, causal relationship runs directly from pay grade to reenlistment probability. A reservist who greatly enjoys reserve participation, for example, may put more effort into reserve activities and so be promoted more rapidly. In this case, he might reenlist only because he enjoys participating, but we would observe a positive association between rank and reenlistment. Furthermore, reservists who have decided early in their term not to reenlist for reasons other than promotion opportunity may not work for promotion, or the unit commander may not consider them for promotion.

Table 14

PROPORTIONAL CHANGES^a IN THE REENLISTMENT RATE
RESULTING FROM CHANGES IN RESERVE ROLE
(Guard/Control Sample)

Role Change	Proportional Change
Promotion from E4 to E5	0.45 ^b
Promotion from E5 to E6	0.29 ^b
Change from combat to non- combat MOS	0.21 ^b

^aThe proportional change is defined as the change in the reenlistment rate due to the change in role, ΔR , divided by a mean reenlistment rate, R , that is, $\Delta R/R$. It is evaluated at the mean reenlistment rate for the experimental population's Guard/Control subsample.

^bBased on a coefficient that is significant at less than the 1 percent level.

Thus, a proportional increase in promotion opportunity would not necessarily achieve as high a retention response as indicated here. For this reason, increasing the number of higher pay grades in a unit may not increase reenlistments as much as our estimates would suggest. Nevertheless, even though part of the measured impact of promotion may be attributable to other factors, promotion ranks high among variables that influence retention.

Combat vs. Noncombat Jobs. The last result in Table 14 says that reservists with noncombat jobs are more likely to reenlist than those with combat jobs. Our survey data did not permit us to discover what aspects of combat jobs discourage reenlistments. Among the explanations may be the nontransferability of the training, the smaller opportunity for promotion since the grade structure for combat units is lower than that for most other reserve units, and finally, the greater risk inherent in the combat job.

The Civilian Job

A reservist's decision to reenlist is directly related to his civilian job. As we saw in Section II, his primary job in the civilian economy interacts with his commitment to the National Guard in a number of ways. We first deal with those explicitly set out in the simple decision analysis of Section II: the reservist's civilian wage rate and hours worked. We then introduce uncertainty about the frequency of future overtime into the discussion. Finally, we look at some qualitative characteristics of the civilian job.

Table 15 suggests how variations in wage rates and hours worked alter reenlistment propensities.

The Civilian Wage Rate. This variable represents the reservist's hourly wage rate in 1977; it has been adjusted (see Appendix E) to take into account regional differences in the cost of living so that the wage rates reflect dollars with the same purchasing power. Our empirical results suggest that the higher the reservist's civilian wage rate, the less likely he is to reenlist, thus confirming the conclusions from our analysis of the reservist's reenlistment decision in Section II. The effect of higher wage rates was small, however; an elasticity of -0.21 means that a 25 percent increase in the real wage rate would lower the average propensity to reenlist by only 2 percentage points.

Hours Worked per Week. This variable reflects the number of hours that a reservist usually works on his civilian job. We theorized in

Table 15

REENLISTMENT RATE ELASTICITIES^a WITH RESPECT
TO CIVILIAN WAGE RATES AND HOURS WORKED
(Guard/Control Sample)

	Elasticity
Civilian wage rate	-0.21 ^b
Hours worked per week	-0.26 ^b

^aElasticities are evaluated at the mean reenlistment rate for the experimental population's Guard/Control subsample and at the means of the Guard/Control survey population.

^bBased on a coefficient significant at less than the 1 percent level.

Section II that the more time an individual worked on his regular civilian job, the less likely he would be to participate in the reserve. Our empirical results support this contention, but again the impact is small; a 20 percent increase in hours worked per week would depress the propensity to reenlist by only 2 percentage points.

Uncertainty about the Availability of Paid Overtime. The variable describing the availability of paid overtime reflects the reservist's estimate of the number of weeks per year that he can make extra money by working overtime; it can take on values ranging from 0 to 52. The more frequently a reservist can work overtime for pay, the more frequently earning extra money and fulfilling his reserve commitment conflict. In terms of forgone income, the cost of continued reserve participation may be much higher for a reservist who can work overtime frequently than for one who can never work overtime. Our empirical result, given in Table 16, suggests that the availability of paid overtime has a negative but small impact on a reservist's propensity to reenlist, again confirming the direction of the effect predicted in Section II.

Kind of Employer. Table 17 summarizes statistical conclusions about how the kind of employer affects reenlistments. These results should be interpreted with care. They are estimates of differential effects relative to a large private firm, and they reflect residual effects of different kinds of employment after the effects of the other variables discussed in this section have been accounted for. These results thus reflect unobserved factors that vary systematically with the kind of employer; scheduling flexibility and longer summer vacations are examples.

Table 16

ELASTICITY^a OF THE REENLISTMENT RATE WITH
RESPECT TO FREQUENCY OF OVERTIME
(Guard/Control Sample)

	Elasticity
Weeks of paid overtime available per year	-0.06 ^b

^aElasticities are evaluated at the mean reenlistment rate for the experimental population's Guard/Control subsample and at the means of the Guard/Control survey population.

^bBased on a coefficient significant at less than the 5 percent level.

Table 17

PROPORTIONAL CHANGES^a IN THE REENLISTMENT RATE ASSOCIATED
WITH DIFFERENT KINDS OF EMPLOYERS
(Guard/Control Sample)

	Proportional Change
Change from private firm with over 500 employees to:	
Middle-sized firm (100 to 500 employees)	0.05
Small firm (less than 100 employees)	0.12 ^b
Self-employed	-0.15
Federal government	-0.04
State and local government	0.19

^aThe proportional change is defined as the change in the reenlistment resulting from the difference in indicated preference, ΔR , divided by a mean reenlistment rate, R , that is, $\Delta R/R$. It is evaluated at the mean reenlistment rate for the experimental population's Guard/Control subsample.

^bBased on a coefficient that is significant at the 10 percent level.

Our results suggest that employees of small private firms and of state and local governments may be more likely to reenlist than employees of large private firms. The result for small private firms must be qualified by our discussion below of the relationship between small firm size and employer's negative attitude toward reserve participation; it says that a reservist employed by a small firm is more likely to reenlist than one employed by large firms, providing that the two firms had the same attitude towards reserve participation. The result for state and local governments may reflect the effect of the long summer vacations enjoyed by teachers; long summer vacations make summer camp attendance easier. Self-employed individuals may be less likely to reenlist than individuals employed by large private firms. There appears to be little difference in the propensity to reenlist between reservists employed by middle-sized private firms or by the federal government and those employed by large private firms.

Employer's Attitude. The survey questioned each reservist on his employer's attitude toward his reserve participation. The reservist was asked to assign one of five rankings ranging from "very favorable" (1) to "very unfavorable" (5). Because the responses to this survey item reflect reservists' subjective impressions, we must use the responses with care. We do not know, for example, how reservists interpreted the survey item--one might view an employer's behavior as reflecting a favorable attitude while another might interpret the same behavior as reflecting an unfavorable attitude.

A reservist who sees his employer's attitude toward his reserve participation as positive is more likely to reenlist than a reservist who sees his employer's attitude as negative. This result is clear from Table 11 (above) when we recognize that more negative perceptions have higher index values.[7] So, the issue is not whether a reservist's perception of his employer's attitude influences his reenlistment decision but how this result should be interpreted. We find a strong relationship even though we are accounting for most important objective job characteristics, including the employer's annual training leave policy. What remains are less tangible considerations like the willingness of the reservist's immediate supervisor to accommodate participation by permitting some flexibility in work hours and the effect of continued participation on the reservist's chances for promotion. Thus, we may interpret reservists' responses to this item as reflecting their perceptions of such considerations.

Employer's Annual Training Leave Policy. This variable indicates whether the reservist's employer requires vacation time be used to attend summer camp. Although the forced use of vacation time is illegal, 9 percent of the survey respondents indicated that they had to use vacation time. Our results indicate that when reservists had to use their own vacation time to attend summer camp, the proportional change in the reenlistment rate was -0.07; this result, however, is not statistically significant.

[7] Employer's attitude was not included in Table 17 since the meaning of an elasticity is not clear when the independent variable is ordinal and subjective.

Changes Since the Last Reserve Participation Decision

At some point in the past, everyone in our sample decided to join the National Guard. The decision to join implies that the circumstances under which the choice was made--as well as the tastes for money and leisure time--were such that participation in the National Guard was in the best interest of each when he made the decision. As time goes on, however, the circumstances surrounding the original enlistment decision may change considerably. Three variables characterize previous decisions: initial enlistment alternative, previous reenlistment, and years of service.

Initial Enlistment Alternative: Civilian vs. Military Life. The aspect of a reservist's choice situation that perhaps changes the most over time is the nature of the alternative to military participation. Many in our National Guard sample first enlisted in 1972, the last year of the draft, and faced a first-term reenlistment decision in 1978. Thirty-eight percent of the guardsmen in our sample had joined the National Guard to avoid being drafted for active duty; the remainder of the sample could have remained civilians. As they faced reenlistment decisions 6 years later, however, all had the option of returning to civilian life. So, other things equal, more of the guardsmen who faced an active duty alternative when they made their last participation decision could be expected to drop out. Our empirical results are consistent with this notion. The proportional change given in Table 18 for the active-duty alternative suggests that many individuals who preferred National Guard participation when the alternative was active military duty no longer preferred participation when the alternative was civilian life.

Table 18

PROPORTIONAL CHANGES^a AND ELASTICITY^b OF THE REENLISTMENT
RATE WITH RESPECT TO LAST DECISION VARIABLES
(Guard/Control Sample)

Comparison	Proportional Change
Original enlistment alternative:	
civilian life vs. active duty	-0.38 ^c
Last decision: reenlistment vs.	
enlistment	0.55 ^c
Variable	Elasticity
Years of service	-0.32 ^c

^aThe proportional change is defined as the change in the reenlistment rate due to the change in role, ΔR , divided by a mean reenlistment rate, R , that is, $\Delta R/R$. It is evaluated at the mean reenlistment rate of the experimental population's Guard/Control subsample.

^bElasticities are evaluated at the mean reenlistment rate of the experimental population's Guard/Control subsample and at the means of the Guard/Control survey population.

^cBased on a coefficient that is significant at less than the 1 percent level.

First-Term or Subsequent Reenlistment. The guardsmen in our sample differed in the number of previous reenlistment decisions made. Many were completing an initial 3- or 6-year enlistment and were facing a first-term reenlistment decision; others had reenlisted at least once. Reenlistment rates generally rise with the number of reenlistment decisions made. Self-selection explains part of this phenomenon.

Enlistees enter the reserve uncertain about their taste for military service. During the first term, the taste for service is formed through experience. Those who dislike military service leave at the first reenlistment opportunity. Those who remain generally have a greater taste for military service. Thus, other things equal, second-term reservists reenlist at higher rates than first-term reservists. Table 18 shows a significantly lower retention rate for first-term reenlistment decisions than for subsequent decisions.

Years of Service. For reservists past their first term, retention rates usually rise with years of service (YOS) up to 20 years. This phenomenon reflects, in addition to self-selection, the pull of the reserve retirement system. The system provides full vesting after 20 years of satisfactory service. Although benefits are not paid until the reservist reaches the age of 60, the value of the pension is substantial relative to the reserve income base. The pull of the system affects first-term reservists least and those with 19 years of service most. Based on these considerations, one would expect higher retention with more years of service.

Another factor--namely, the number of years since the last participation decision--may work in the other direction. Guardsmen in the sample differed as to the number of years since they last faced a decision about reserve participation. First termers in the group had enlisted for 3 or 6 years; others had already reenlisted for a 1-year term. The elements affecting a reservist's choice change, and they change more as the interval since the last decision increases. A situation that led to a positive participation decision 6 years earlier is likely to have changed more than a situation that led to a positive

participation decision only a year earlier. One cannot say beforehand, however, whether the cumulative effect of changes over time increases, decreases, or leaves unchanged a person's propensity to reenlist.

The negative sign of the estimated coefficient on the years of service variable implies that for the first termers in this sample, changes in choice situation since the last decision were cumulative and discouraged reenlistment. In ordinary terms, this simply means that events such as marriage, the birth of children, or job changes, more of which are likely to take place in 6 years than in 3 years, tend to lower retention rates for 6-year enlistees.

RESERVISTS' PERSONAL CHARACTERISTICS

Our findings regarding the links between reservists' characteristics and their propensity to reenlist is summarized in Table 19. The findings support two major conclusions. First, the older a reservist is when he reaches the reenlistment decision point, the more likely he is to reenlist. Second, women, blacks, and the less educated reenlist at higher rates.

Two key changes that occur as a reservist gets older help to explain his increasing propensity to reenlist. First, a reservist who accumulates 20 years of satisfactory service can start to draw a pension when he reaches 60. The older a reservist is when he comes up for reenlistment, the larger these pension benefits are likely to loom in his decision. Second, an older reservist probably has a more stable civilian life and is less likely to experience the major problems that discourage continued participation. Many reservists in the bonus experiment joined the reserve in their late teens or early 20s. Major changes such as taking a new job, getting married, and becoming a parent

Table 19

ELASTICITIES^a AND PROPORTIONAL CHANGES^b OF THE
REENLISTMENT RATE WITH RESPECT TO
INDIVIDUAL CHARACTERISTICS
(Guard/Control)

Variable	Elasticity
Age	1.10 ^c
Number in household	0.11
Spouse's annual earnings	-0.01

Comparisons	Proportional Change
Sex: female/male	0.43 ^d
Race: black/other ^e	0.68 ^d
Marital status: married/other ^f	-0.01
Not a high-school graduate/ high-school graduate	0.13
College graduate/not a college graduate	-0.31 ^d

^aElasticities are evaluated at the mean reenlistment rate of the experimental population's Guard/Control subsample and at the means of the Guard/Control survey population.

^bThe proportional change is defined as the change in the reenlistment rate due to the change in role, ΔR , divided by a mean reenlistment rate, R , that is, $\Delta R/R$. It is evaluated at the mean reenlistment rate of the experimental population's Guard/Control subsample.

^cBased on a coefficient that is significant at less than the 1 percent level.

^dBased on a coefficient that is significant at less than the 5 percent level.

^e"Other" includes whites.

^f"Other" includes single, separated, divorced, and widowed.

that occur frequently in the lives of men and women in their early and mid-20s make continued participation difficult. These changes occur less often as reservists grow older.

This relationship between age and reenlistment rates requires a major qualification since, as we said earlier, our survey sample reflected a very narrow age range; most of the individuals in our sample are in their middle and late 20s. Our results should be seen as reflecting only the behavior of reservists in that age range.

Table 19 shows also that women, blacks, and the less well educated tend to reenlist at higher rates. In Section II, we indicated that reserve participation may be seen as a way of hedging against future unemployment or poor economic prospects. Women, blacks, and the less well educated have the poorest economic prospects in our society. Our coefficient estimates for these variables suggest that reserve service may provide a hedge against future adverse job market contingencies and that a reservist may be more likely to reenlist if he sees his civilian economic prospects as uncertain.

V. CONCLUSION

FINDINGS OF THE STUDY

A simple model of the reservist's reenlistment decision based on moonlighting labor market theory was presented in Section II. This model pointed to five variables that influence the reenlistment decision: net reserve pay, net required days of reserve service, civilian wage rate, number of hours worked on the civilian job, and frequency of overtime opportunities on the civilian job. The theory predicted that higher net reserve wages and fewer net reserve days would increase reenlistment rates. It also predicted that higher civilian wages, longer civilian hours, and more frequent overtime opportunities would decrease reenlistment rates.

The estimated model in Section IV shows that the coefficients of the five variables have the predicted sign and that four of the five are statistically significant. Our empirical results thus confirm the moonlighting model as an accurate description of reenlistment decisions. But they also show that reenlistment decisions are not very sensitive to the five variables. Other factors also seem to be at work. The reserve reenlistment decision, then, is more complex than the simple decision suggested by moonlighting labor market theory.

To explain the low sensitivity of reserve reenlistment to the moonlighting variables, we suggest that the qualitative aspects of reserve participation influence the reservist's decision. All jobs--full-time and part-time--have qualitative aspects that directly affect a worker's subjective well-being. These qualitative aspects are not

usually included in moonlighting labor market theory. If the qualitative aspects of reserve participation are more important to reservists than their money earnings and time costs, then their reenlistment decisions will not be very sensitive to changes in the standard moonlighting variables. So, our empirical results are consistent with the notion that reservists value the qualitative aspects of participation. In a sense, reserve participation may provide a unique combination of a second job and a leisure time activity.

We found that reserve reenlistment decisions depend on variables that describe the unique characteristics of the reserve job. For example, military grade is an indication of a reservist's status in his unit. We found that a reservist's grade (after controlling for pay differences in position) significantly affected his reenlistment decision. Although part of this effect may be due to a reverse dependence (individuals not planning to reenlist may not work for promotion), it is consistent with the notion that status in a reserve unit plays an important part in the decision to reenlist. We also found that reservists in noncombat jobs are more likely to reenlist than those in combat jobs.

Unique aspects of the reserve job also lend importance to certain aspects of the reservist's civilian job. For example, the reserve job occasionally requires full-time participation (annual training), which may conflict with civilian work time. This creates an interdependence between the civilian employer's attitudes and policies and reserve participation. We found reenlistment decisions to depend importantly on employer attitudes and policies.

Previous military experience and the circumstances of original enlistment were important determinants of reenlistment. Individuals who enlisted in the reserve to avoid being drafted into the active force reenlisted at much lower rates than "volunteer" enlistees. This finding helps to explain the relatively low reenlistment rates experienced by the Army Reserve components through 1978 (the last year in which draft-motivated reservists were making first-term reserve reenlistment decisions). With these draft-motivated reservists gone from service, the Army Reserve components are experiencing a substantial increase in first-term reenlistment rates.

Finally, the demographic composition and education of the reenlisting cohort significantly affected reenlistment. Females, blacks, and those with less education reenlisted at higher rates. This finding is consistent with the notion that reserve participation may serve as a hedge against unemployment. Also, older reservists reenlisted at higher rates than younger reservists--thanks either to the increased value of retirement income or to a more stable civilian and family life.

IMPLICATIONS

Reserve reenlistment rates will more than double in the volunteer era (after 1978), owing both to the absence of reservists who enlisted to escape the draft and to changes in the characteristics of reservists enlisting in the volunteer era. Cohorts approaching reenlistment in the volunteer era will contain more female, black, older, and less educated reservists. This increase in retention rates will allow reserve policymakers more selectivity in filling career billets and should improve the quality of career reserve personnel.

Reserve manpower policymakers appear to have little leverage in raising reenlistment rates through pay increases. A 10 percent pay increase would bring only a 2 percent increase in reenlistment rates. Indeed, reserve retention appears to be relatively insensitive to most economic factors tested.[1]

Civilian employers have a great influence on reenlistment decisions. Their attitudes and policies affect reenlistment decisions in many ways. The efforts of the reserve community to improve those attitudes and policies and to enlist the support of employers appear to be directed at an important problem.

[1] One important qualifier to this conclusion is the possible effect of reserve retirement. Since this study dealt primarily with younger reservists with a narrow range of years of service, we did not include the value of retirement benefits in the analysis. However, the retirement system makes reserve participation unique among moonlighting jobs. After 20 years of satisfactory service, a reservist is vested in a cost-of-living adjusted retirement plan which begins payment when he reaches the age of 60. The level of payment depends primarily on the grade level at service termination and the total number of days served (including active duty time). Further studies that include a range of individuals with varying years of service are needed to evaluate this effect.

Appendix A

CALCULATION OF EXPECTED BONUS EFFECTS

The designing of the bonus experiment required an estimate of the retention rate expected from the offering of the bonus. This calculation determined partly how widely the bonus could be offered and still meet the overall budgetary constraints set by Congress. The retention rate in the presence of the bonus was calculated by converting the bonus to an equivalent pay raise and applying an assumed elasticity of 1.0 to historical retention rates.

Retention rates without the bonus, assumed to differ for first-term and career reservists, were estimated as follows: in the National Guard, 23 percent for first termers and 56 percent for reservists with 6 and 7 years of service; in the Army Reserve, 27 percent and 58 percent.

To predict the effect on retention of the bonus, the gain in annual reserve income for a reenlistee was estimated using a present value calculation:

3-Year Term:

$$\frac{G}{100} = \frac{900 + \sum_{i=1}^6 \frac{W_B}{(1+d)^i}}{\sum_{i=1}^6 \frac{W_0}{(1+d)^i}}$$

6-Year Term:

$$\frac{G}{100} = \frac{450 + \sum_{i=1}^3 \frac{W_B}{(1+d)^i}}{\sum_{i=1}^3 \frac{W_0}{(1+d)^i}}$$

where

G = estimated annual percentage increase in reserve income due to the bonus

d = discount rate

W_B = annual reserve income with a bonus

W_0 = annual reserve income without bonus

The discount rate assumed for the calculation was 10 percent. The annual pay without a bonus was assumed to be \$1500--approximately the pay of an E5 with 6 to 8 years of service. The annual pay with a bonus was then \$1650.

Estimates based on these assumptions show the reserve pay increase to be 22 percent for a 3-year term and 24 percent for a 6-year term. Although this assumes that an equivalent pay increase was given to those choosing 1-year extensions, it was also assumed that only 5 percent would choose 1-year extensions. Thus, only a small error was included in the estimate.

An elasticity of 1.0 was then assumed with respect to the annual secondary wage--that is, a 24 percent pay increase would raise retention

rates by 24 percent. This assumption was slightly higher than both the Gates Commission assumptions applied to our sample and measurements of civilian moonlighting pay elasticities. The more liberal assumption was used so as to decrease the risk of budget overruns. The estimated reenlistment rates that would thus result from the bonus are shown below, alongside the historical reenlistment rates:

	Historical Rate	Bonus Rate
For the National Guard		
First term	23%	29%
6 and 7 years of service ...	56%	69%
For the Army Reserve		
First term	27%	34%
6 and 7 years of service ...	58%	72%

Appendix B

DESCRIPTION OF DATA SOURCES AND ANALYTIC FILE

The major analyses described in this report were based on survey data collected during the 1978 Selected Reserve Reenlistment Bonus Test. The model presented in the report is based on the surveys returned by National Guard personnel in experimental control areas. Our analysis of survey response bias indicated that different modes of survey administration and the presence of different incentives (bonus) caused survey response bias in the total experimental sample. This subsample was used for model estimation because the procedures for survey administration were uniform in the National Guard and the reenlistment options and pay offered were the same to all individuals in control areas. The sample used for the model was a subset of the analytic population of about 15,300 defined for Rand's evaluation of the 1978 bonus test. The information about these reservists originated from several sources, including eligibility lists, administrative personnel records, and a monthly reporting system, as well as from the survey questionnaires. This appendix identifies these data sources and describes the procedures and assumptions used in creating and maintaining the data bases associated with the bonus test.

DATA SOURCES

To administer, monitor, and evaluate the bonus test, a set of data requirements were identified in the planning of the test. The sources of these data are described below. A more detailed discussion of the survey associated with the bonus test is found in Appendix C.

Initial Eligibility Rosters (IER)

Before the test was initiated, each component produced official lists, by unit, of individuals who met the eligibility criteria in both bonus and control areas. An official roster was created from these individual lists for the purpose of monitoring the experiment. When aggregated to the unit level, the IERs were used by Rand as a distribution list for the survey questionnaires and by individual units as survey sample lists.

Reserve Personnel Master Files (RPMF)

The IER contained only a limited amount of information about each reservist; to supplement these data, Rand obtained a copy of each individual's Reserve Personnel Master File (RPMF) record. The RPMF data served two purposes. First, as elaborated below, by linking the IER and RPMF at the individual level, we were able to verify whether or not an individual was eligible for the bonus. Second, we used the RPMF for evaluating the bonus test. Characteristics such as race, education, and marital status were hypothesized as possible explanatory variables for the reenlistment decision. The RPMF was the most logical and complete source from which to obtain this individual level information.

Monthly Status Reports

By the 15th day of each month, each unit participating in the experiment submitted a report containing the reenlistment decision of each bonus-eligible reservist who had reached the end of his term of service (ETS) in the preceding month; for example, for individuals with ETS dates in March, a report was to have been submitted by April 15. These reports listed individuals who either separated or reenlisted and, for those who reenlisted, the length of the term selected. These monthly status reports enabled us to provide ODASD (Reserve Affairs) with timely information about reenlistments and to monitor the information-gathering process closely.

Survey Questionnaires

Data to model the process by which individuals decided whether or not to reenlist were collected by means of a self-administered questionnaire. The questionnaire was distributed to all individuals listed on the IERs as part of the processing related to reenlistment or separation. The questionnaire collected information on military experience, demographic background, family resources, labor-force experience, and factors related to the reenlistment or separation decision.

THE ADMINISTRATIVE FILE

Rand monitored the bonus test and collected the reenlistment information by creating and continuously updating an administrative file. This file was created by merging the IER information with the RPMF by means of individual Social Security numbers. Reservists who

were identified by the National Guard or Army Reserve as bonus-eligible after the start of the test were also added to this file. By the end of the bonus test, the file contained a total of 15,721 reservists declared eligible for the bonus.

THE ANALYTIC FILE

The analytic file, used both for this report and for the evaluation of the bonus test, was created in two steps: First, the administrative file and a file created from returned survey questionnaires were merged; then, specific subsets of records were excluded. The survey file consisted of 6018 records.

To link the administrative and the survey files, we used a set of variables that appeared on both: two administrative variables (reserve component and state in which the unit was located) and five individual variables (Social Security number, date of birth, sex, pay grade, and result of the reenlistment decision). A link was considered adequate if two records matched on the administrative variables and on at least three of the individual variables. Most of the accepted links included a match of SSN, sex, and date of birth. This process yielded 4210 National Guard and 993 Army Reserve test participant records containing a matched survey and administrative record.

Appendix C

SUMMARY OF SURVEY DESIGN, QUESTIONNAIRE CONTENTS, AND ADMINISTRATIVE PROCEDURES

To study the reenlistment decision process, we collected data by means of a survey. In the course of the experiment, 6018 individuals returned a self-administered questionnaire to Rand. This appendix describes the survey design, the sample, the contents of the questionnaire, the data collection methods, and the procedures used in data reduction. A copy of the questionnaire is included at the end of this appendix.

CONCEPTUAL FRAMEWORK

The primary goal of the survey was to collect information on the factors underlying a reservist's decision either to separate from or to reenlist in the Army Reserve or National Guard. Since the survey was conducted in conjunction with the 1978 Selected Reserve Reenlistment Bonus Test, we designed the questionnaire to provide data with which to assess the role of the bonus offer in either a separation or reenlistment decision. In addition, since little is known about the demographic composition of the reserve, we used the survey to develop a descriptive data base about the individuals selected for the experiment. To achieve these goals, we had to administer the survey questionnaire to reservists in both bonus and control areas so as to obtain data about the factors that enter into a separation or reenlistment decision both with and without a bonus offer.

Our general approach to designing the questionnaire was influenced by various economic, sociological, and psychological perspectives on the behavior of reservists making choices among occupational alternatives, including the moonlighting theory. We included in the questionnaire items that had been used in previous research, for example, labor force experience, as well as those that would allow testing more speculative hypotheses, such as that regarding employer attitudes towards reserve participation.

Rand analysts, as well as MRA&L staff members working on a broad range of reserve-related problems, provided input to the survey design. After all the data requirements were identified, past data collection methods and formats for such data were reviewed. The questionnaire was then drafted and pretests conducted with a representative sample from each of the reserve components. After additional reviews and revisions, the final questionnaire was prepared.

QUESTIONNAIRE CONTENTS

The final questionnaire contained five sections, each of which collected information in a specific substantive area. The first section, Military Experience, collected basic data, including the date of entry, pay grade, current military occupational specialty, number of drills paid for in the past year, and distance to drill location. Section II, Reenlistment/Extension Decision, contained a subjective evaluation of the role of various economic, military, social, and personal factors related to the reservist's decision either to separate from the reserves or to reenlist or extend the term of service. Several questions in this section, asked only of reservists in the bonus areas, dealt with the role of the bonus offer in the decision.

Section III, Individual Characteristics, focused on basic demographic facts such as sex, birth date, marital status at both entry and interview, and education. Section IV, Labor Force Experience, asked for the type of employment status information generally collected by the Bureau of the Census. The reservist's occupation and industry, hours of work, pay level, and availability of overtime were ascertained. Also included were items about the attitude and policy of the respondent's employer toward the reserve. The last section, Family Resources, summarized total family income for 1977 and estimated household assets and debts. The last item on the questionnaire asked for the individual's Social Security number, to be used in linking the survey data to other data collected in the experiment.

SURVEY SAMPLE

Before the bonus test was initiated, each component produced official lists, by unit, in both bonus and control areas, of each reservist who met the bonus eligibility criteria. A copy of each list, called the Initial Eligibility Roster (IER), was sent to ODASD (Reserve Affairs) for the purposes of monitoring the experiment; a second copy was retained at the unit level. In bonus-area units, reservists on the list were offered the bonus and given a copy of the survey questionnaire. Their reenlistment decisions reported to ODASD (Reserve Affairs) on a regular basis. In control areas, the IERs were used as a sample list for the survey and as a basis for reporting individual reenlistment decisions. The sample for the survey, then, was defined to consist of all individuals whose names appeared on the IERs prior to the test and any who were added in the course of the program.

ADMINISTRATIVE PROCEDURES

This was our first experience with administering military surveys, and the time for developing and fielding the survey was extremely short (2 to 3 months). The administrative procedures were developed after consideration of the survey pretest experience, the practices in reserve units, the administrative requirements of the experiment, and the cost of survey administration and processing.

The technical coordination of the survey was the responsibility of the Rand-DoD Survey Group, a research effort sponsored by OASD (MRA&L). The data were collected by component-specific administrative units, coordinated by a component primary point-of-contact (PPOC). To insure intercomponent comparability, the Rand group reviewed and coordinated all instructions, notices, and letters sent by the PPOC.

In the Army Reserve, it was decided to deal directly with each of the units containing bonus-eligible individuals. The unit was responsible for distributing and collecting survey materials. In the National Guard, PPOCs at the state headquarters of each state with bonus-eligible individuals distributed and collected survey materials from units. Rand was responsible for the initial mailing of materials to both components--either directly to Army Reserve units or to National Guard state headquarters. The operational data collection procedures for each administrative unit were the following:

- o Rand mailed materials either to the National Guard state headquarters or to Army Reserve unit commanders.

- o The administrative units provided a questionnaire to each reservist whose name appeared on the IER during his or her retention counseling session, together with a letter explaining the intent of the study and an envelope in which a completed questionnaire was to be sealed.
- o The administrative unit collected sealed questionnaires, and returned them to The Rand Corporation every month at the same time as reenlistment decisions were reported to ODASD (Reserve Affairs).

The administrative instructions for the survey suggested that the individual responsible for survey administration at the unit level maintain a record of reservists who had been given the survey form. Specifically, the instructions suggested that the IER be used as a survey accounting form--for example, that checks be placed on the roster indicating that a survey form and accompanying envelope had been distributed and collected. Unfortunately, we did not require that copies of the annotated IERs be sent to Rand at the end of the experiment. This oversight meant that no data existed with which to distinguish between nonreceipt of a questionnaire by a specific respondent listed on the IER and nonreturn of a questionnaire from a respondent who actually received a form. The two possibilities are analytically quite different. The former means that the reservist had no opportunity to participate for administrative reasons; the latter represents a conscious decision not to do so.

The nature of the reserve population and the organizational structure of units may have led to the failure of some reservists to

receive questionnaires. For example, some reservists--especially those who had decided to separate--may not have attended a retention counseling session. Also, if a unit underwent a turnover in administrative personnel, the requirements for survey administration may not have been transferred to the new personnel.

The lack of systematic reporting from the units about both nonreceipt and nonresponse makes a clear interpretation of the response rates difficult. Our experience has shown that future surveys of this population will require closer monitoring of the fieldwork and greater attention to a survey-reporting system.

DATA PROCESSING OF RETURNED QUESTIONNAIRES

Prior to data entry, each questionnaire was manually edited by Rand staff using a set of question-specific instructions.

Questionnaires were prepared for data entry by checking them for legibility, assigning missing-value and other audit codes, zero-filling numeric fields, rounding time and income entries, etc. Numeric codes were assigned to open-ended entries such as state names, months, occupations, and industries. Marginal comments were reviewed and, where appropriate, incorporated into the data.

After the data were entered on magnetic tape, the file was checked using two sets of "data cleaning" specifications. The first set involved range and legitimate value checks that compared the response to each item against all allowed values. The second set checked logical relationships between variables. Discrepancies and inconsistencies that could not be resolved by manually checking the questionnaires were flagged on the file. These special flags, associated with each variable, were used to determine whether or not a variable was usable;

after a variable was selected, the flags were used for excluding specific records from an analysis. The data were then linked to the administrative file, as described in Appendix B.

**THE RAND CORPORATION
SELECTED RESERVE REENLISTMENT BONUS TEST PROGRAM STUDY**

You have been asked to participate in a study being conducted by The Rand Corporation about the Selected Reserve Reenlistment Bonus Test Program.

Please answer all the questions as completely as you can. When you have finished the questionnaire, check through it to be sure you have answered all the questions that pertain to you. Then place the questionnaire in the envelope provided. Seal the envelope and it will be immediately forwarded to The Rand Corporation.

PROTECTION OF PRIVACY

Public Law 93-579, entitled the Privacy Act of 1974, requires that all individuals be informed of the purposes and uses to be made of the information that is collected.

AUTHORITY: Public Law 95-79 and 95-111

PURPOSE: The information obtained in the survey will be used to evaluate the effectiveness of reenlistment bonuses in the Army Reserve Components and to describe the characteristics of the current reserve population.

USES: The information will be used for research and analysis purposes only. The Rand Corporation, under contract to the Reserve Compensation System Study Group OASD(MR&L), has the primary research and analysis responsibility.

EFFECTS OF NON-DISCLOSURE: Participation in the survey is voluntary. No penalty will be imposed for failure to respond to any particular questions.

2

INSTRUCTIONS

READ EACH QUESTION CAREFULLY.

CIRCLE THE NUMBER OF THE ONE ANSWER THAT MOST CLOSELY FITS YOU AND FOLLOW ANY INSTRUCTIONS NEXT TO THE NUMBER YOU CIRCLED, WHICH TELL YOU TO GO TO ANOTHER QUESTION.

Example:

1. ARE YOU CURRENTLY IN THE ARMED SERVICES?

Yes ① ♦ GO TO Q.3
No 2 ♦ ANSWER Q. 2

SOMETIMES YOU WILL BE ASKED TO ENTER A NUMBER OR TO CIRCLE A SET OF CODE NUMBERS. ENTER YOUR NUMBER ON THE LINE. IF YOU DON'T REMEMBER OR HAVE NO NUMBER, CIRCLE THE APPROPRIATE SET OF CODE NUMBERS.

Example:

1. WHAT IS YOUR SELECTIVE SERVICE LOTTERY NUMBER?

Lottery number _____
Do not remember 888
Does not apply, no lottery number 000

I. MILITARY EXPERIENCE

DO NOT
WRITE IN
THIS SPACE

1. ENTER TODAY'S DATE.

_____/_____/_____
Month Day Year

21-26/

2. ENTER THE STATE WHERE YOUR GUARD/RESERVE UNIT IS LOCATED.

State _____

27-28/

3. WHEN DID YOU FIRST ENTER MILITARY SERVICE (active or reserve)? Enter date on your initial contract.

_____/_____/_____
Month Day Year

29-34/

4. WAS YOUR INITIAL CONTRACT FOR:

(Circle only one)

2 years 2
3 years 3
4 years 4
5 years 5
6 years 6

35/

5. WHAT IS YOUR SELECTIVE SERVICE LOTTERY NUMBER?

Lottery number _____
Do not remember 888
Does not apply, no lottery number ... 000

36-38/

6. HOW DID YOU FIRST ENTER MILITARY SERVICE? Choose the response which best describes your entry into service, active or reserve, whichever came first.

(Circle only one)

Was drafted 1
Enlisted to avoid the draft 2
Enlisted for reasons other than to avoid
the draft 3

39/

7. IF YOU HAVE SERVED MORE THAN ONE TERM OF DUTY, WAS YOUR LAST TERM FOR:

(Circle only one)

Does not apply, I just
completed my first term 0
1 year or less 1
2 years 2
3 years 3
4 years 4
5 years 5
6 years 6

40/

8. WHICH DID YOU ENTER FIRST, THE GUARD/RESERVE OR THE ACTIVE SERVICE?

Guard/Reserve 1
Active Service 2

DO NOT
WRITE IN
THIS SPACE

41/

9. TO THE NEAREST YEAR AND MONTH, HOW LONG HAVE YOU SERVED IN THE GUARD/RESERVE?
Include initial active duty for training.

Years _____
and
Months _____

42-43/

44-45/

10. WHAT IS YOUR CURRENT PAY GRADE?

(Circle only one)

E-1 1
E-2 2
E-3 3
E-4 4
E-5 5
E-6 6
E-7 7
E-8 8
E-9 9

46/

11. WHEN WERE YOU APPOINTED TO YOUR CURRENT GRADE?

_____/_____
Month Year

47-50/

12. WHAT IS YOUR CURRENT MOS ASSIGNMENT? Use the first 2 numbers and the letter of your MOS. For example, MOS 11B20 would be entered 11B. If you don't know, enter 000.

Current MOS _____

51-53/

13. FOR WHAT MOS WERE YOU MOST RECENTLY TRAINED, IN SCHOOL OR OJT, WHETHER OR NOT THIS IS YOUR CURRENT MOS?

Trained MOS _____

54-56/

14. HOW MANY PAID DRILLS ARE AUTHORIZED IN YOUR UNIT EACH YEAR?

(Circle only one)

48 paid drills 1
24 paid drills 2
Other (please specify) ...

_____ 8

57/

15. LAST YEAR, HOW MANY DRILLS WERE YOU PAID FOR?

Number of paid drills _____

58-59/

16. HOW MANY MILES IS IT FROM YOUR HOME TO YOUR MONTHLY GUARD/RESERVE DRILLS?

Number of miles _____

60-62/

CARD 01

CARD 02

DO NOT
WRITE IN
THIS SPACE

17. HOW MANY MINUTES DOES IT USUALLY TAKE YOU TO GET FROM YOUR HOME TO YOUR MONTHLY GUARD/RESERVE DRILLS?

Number of minutes _____

13-15/

18. WITHIN THE PAST 2 YEARS, HOW MANY DAYS HAVE YOU SERVED IN A MOBILIZATION OR EMERGENCY CALLUP?

Number of days _____

Does not apply, never served in callup . . . 000

16-18/

19. DID THIS SERVICE IN MOBILIZATION OR CALLUP CAUSE YOU TO HAVE A GAIN OR LOSS IN OVERALL ANNUAL INCOME?

(Circle only one)

Does not apply, never served in callup 0

Income gain 1

Income loss 2

Neither income gain nor loss 3

19/

20. BELOW IS A LIST OF BENEFITS AVAILABLE IN THE GUARD/RESERVE. WHICH OF THESE HAVE YOU USED OR DO YOU CURRENTLY USE?

(Circle as many as apply)

Tax advantage for State income 1

Medical Benefits 2

Educational Benefits 3

Injury/Death Benefits 4

Group Insurance 5

Free License plates 6

Post/Base Exchange (PX) 7

Other (please specify)

_____ 8

None of the above 9

20-28/

II. REENLISTMENT/EXTENSION DECISION

21. WHAT IS THE 1978 EXPIRATION DATE OF YOUR TERM OF SERVICE (ETS)?

_____/_____/_____
Month Day Year

29-34/

22. ARE YOU REENLISTING OR EXTENDING IN THE GUARD/RESERVE AT THIS TIME?

(Circle only one)

Yes, 1 year 1

Yes, 3 years 2

Yes, 6 years 3

No 4

➡ GO TO Q. 27, PAGE 6

➡ ANSWER Q. 23-26

35/

CARD 02

ANSWER THIS PAGE ONLY IF YOU ARE NOT REENLISTING OR EXTENDING.

23. HOW IMPORTANT WERE THE FOLLOWING IN YOUR DECISION NOT TO REENLIST OR EXTEND IN THE GUARD/RESERVE? Answer for each item

	Very important	Moderately important	Somewhat important	Slightly important	Not at all important
Was not eligible to reenlist	1	2	3	4	5
Moving to take a new job	1	2	3	4	5
Moving, job transfer to another area	1	2	3	4	5
Distance to guard/reserve unit	1	2	3	4	5
Callups/mobilizations	1	2	3	4	5
Conflict with educational program	1	2	3	4	5
Health	1	2	3	4	5
Conflict with civilian job	1	2	3	4	5
Conflict with family or leisure time	1	2	3	4	5
General dislike of military	1	2	3	4	5
Insufficient pay	1	2	3	4	5
Not eligible for 1978 reenlistment bonus	1	2	3	4	5
Extra income not needed	1	2	3	4	5
Dislike unit's training practice	1	2	3	4	5
Disagree with personnel and pay policies	1	2	3	4	5

DO NOT
WRITE IN
THIS SPACE

36-50/

24. WHICH OF THESE WAS THE MOST IMPORTANT IN YOUR DECISION NOT TO REENLIST OR EXTEND?

(Circle only one)

- Was not eligible to reenlist 01
- Moving to take a new job 02
- Moving, job transfer to another area 03
- Distance to guard/reserve unit. 04
- Callups/mobilizations 05
- Conflict with educational program 06
- Health 07
- Conflict with civilian job 08
- Conflict with family or leisure time 09
- General dislike of military 10
- Insufficient pay 11
- Not eligible for 1978 reenlistment bonus 12
- Extra income not needed. 13
- Dislike unit's training practice 14
- Disagree with personnel and pay policies. 15

51-52/

25. HOW DO YOU PLAN TO REPLACE THE INCOME YOU EARNED FROM GUARD/RESERVE PARTICIPATION?

(Circle as many as apply)

- Do not plan to replace income immediately 1
- Have found another part time job 2
- Have received a pay increase on my full time job . . . 3
- Will work more hours on my full time job. 4
- Have a new full time job that pays more 5
- Spouse or other family member will work 6
- Will receive financial assistance from school. 7
- Other (please specify) 8

53-60/

ANSWER Q. 26 ONLY IF YOU ARE NOT REENLISTING OR EXTENDING.

26. WOULD YOU HAVE REENLISTED OR EXTENDED IF ALL 1978 BONUS TEST PAYMENTS WERE DOUBLED?

(Circle only one)

- Yes, would have reenlisted/extended for 3 years 1
 Yes, would have reenlisted/extended for 6 years 2
 No, would not have reenlisted 3

GO TO Q. 30

DO NOT
WRITE IN
THIS SPACE

62

ANSWER Q. 27-28 ONLY IF YOU ARE REENLISTING OR EXTENDING

27. HOW IMPORTANT WERE THE FOLLOWING IN YOUR DECISION TO REENLIST OR EXTEND IN THE GUARD/RESERVE? Answer for each item.

	Very Important	Moderately Important	Somewhat Important	Slightly Important	Not at all Important
The friendships and social life	1	2	3	4	5
The military way of life	1	2	3	4	5
Training opportunities	1	2	3	4	5
Promotion opportunities	1	2	3	4	5
Helps me in my business/profession	1	2	3	4	5
The extra income it provides	1	2	3	4	5
Retirement points and benefits	1	2	3	4	5
The 1978 reenlistment bonus	1	2	3	4	5
Duty towards country	1	2	3	4	5
Service to community	1	2	3	4	5

62-71/

28. WHICH OF THESE WAS THE MOST IMPORTANT IN DECIDING TO REENLIST OR EXTEND?

(Circle only one)

- The friendships and social life 01
 The military way of life 02
 Training opportunities 03
 Promotion opportunities 04
 Helps me in my business/profession . . . 05
 The extra income it provides 06
 Retirement points and benefits 07
 The 1978 reenlistment bonus 08
 Duty towards country 09
 Service to community 10

72-73/

29. WOULD YOU HAVE REENLISTED OR EXTENDED IF THE 1978 BONUS TEST HAD NOT BEEN OFFERED?

(Circle only one)

- Yes, would have reenlisted/extended for 1 year 1
 Yes, would have reenlisted/extended for 3 years 2
 Yes, would have reenlisted/extended for 6 years 3
 No, would not have reenlisted 4

74/

CARD 03

TO BE ANSWERED BY EVERYONE

30. SIX MONTHS AGO, HOW DID YOU FEEL ABOUT REENLISTMENT OR EXTENSION IN THE GUARD/RESERVE?

(Circle only one)

- Definitely reenlist 1
- Probably reenlist 2
- Undecided 3
- Probably not reenlist 4
- Definitely not reenlist 5

DO NOT
WRITE IN
THIS SPACE

13/

31. HOW MUCH INFLUENCE DID EACH OF THE FOLLOWING PEOPLE HAVE ON YOUR REENLISTMENT DECISION? Answer for each item.

	A great deal	Quite a bit	Some	A little	Not at all
Girlfriend/wife, boyfriend/husband	1	2	3	4	5
Parents	1	2	3	4	5
Unit reenlistment counselor	1	2	3	4	5
Unit technician	1	2	3	4	5
Unit commanding officer	1	2	3	4	5
Other member of guard/reserve	1	2	3	4	5

14-19/

III. INDIVIDUAL CHARACTERISTICS

32. WHAT IS YOUR BIRTH DATE?

____ / ____ / ____
Month Day Year

20-25/

33. ARE YOU MALE OR FEMALE?

- Male 1
- Female 2

26/

34. WHAT WAS YOUR MARITAL STATUS WHEN YOU FIRST ENTERED THE GUARD OR RESERVE?

(Circle only one)

- Married 1
- Legally separated 2
- Divorced 3
- Widowed 4
- Never married 5

27/

35. WHAT IS YOUR CURRENT MARITAL STATUS?

(Circle only one)

- Married 1
- Legally separated 2
- Divorced 3
- Widowed 4
- Never married 5

28/

CARD 03

DO NOT
WRITE IN
THIS SPACE

36. WHAT DO YOU CONSIDER TO BE YOUR MAIN RACIAL OR ETHNIC GROUP?

(Circle only one)

- Afro-American/Black/Negro 1
- American Indian 2
- Hispanic/Puerto Rican/Cuban/Mexican/Latin 3
- Oriental/Asian/Chinese/Japanese/Korean/Filipino 4
- White/Caucasian 5
- Other (please specify) 6

29/

37. WHAT IS THE HIGHEST GRADE OR YEAR OF REGULAR SCHOOL OR COLLEGE YOU EVER FINISHED AND GOT CREDIT FOR?

Highest grade _____

30-31/

38. WHAT IS THE HIGHEST DIPLOMA OR DEGREE YOU HAVE?

(Circle only one)

- No high school diploma 00
- High school equivalency diploma (GED) 11
- High school diploma 12
- Associate (Jr. College) 14
- BA/BS (Bachelors) 16
- MA/MS (Masters) 18
- MD/Ph.D./LLB 20
- Other (please specify) 22

32-33/

39. WHERE ARE YOU LIVING NOW?

(Circle only one)

- In a large city (over 250,000) 1
- In a suburb near a large city 2
- In a medium sized city (50,000-250,000) 3
- In a suburb near a medium sized city 4
- In a small city or town (under 50,000) 5
- On a farm or ranch 6
- In a rural area but not on a farm or ranch 7

34/

IV. LABOR FORCE EXPERIENCE

40. WHAT IS YOUR CURRENT PRIMARY ACTIVITY, OTHER THAN THE GUARD/RESERVE?

(Circle only one)

- Working full time 1
- Working part time 2
- Unemployed/laid off 3
- Full time student 4
- Part time student 5
- Keeping house 6
- Other (please specify) 8

ANSWER Q.41-52

GO TO Q.53, PAGE 10

35/

ANSWER Q. 41-52 ONLY IF YOU ARE CURRENTLY WORKING.

41. WHAT KIND OF WORK DO YOU DO? (for example: electrical engineer, carpenter, high school teacher, stock clerk, typist, etc.)

Kind of work _____

DO NOT
WRITE IN
THIS SPACE

36-38/

42. WHICH OF THE FOLLOWING BEST DESCRIBES YOUR EMPLOYER?

(Circle only one)

- | | | |
|---|---|---------------|
| The Federal Government | 1 | } GO TO Q.44 |
| The State Government | 2 | |
| The Local Government | 3 | |
| I am self-employed | 4 | |
| Private firm with more than 500 employees | 5 | } ANSWER Q.43 |
| Private firm with between 100 and 500 employees | 6 | |
| Private firm with less than 100 employees | 7 | |

39/

ANSWER Q. 43 ONLY IF YOU ARE EMPLOYED BY A PRIVATE FIRM.

43. WHAT KIND OF PLACE DO YOU WORK FOR? (for example: TV and radio manufacturing, retail shoe store, etc.)

Place of employment _____

40-42/

44. HOW MANY HOURS PER WEEK DO YOU USUALLY WORK AT THIS JOB?

Hours per week _____

43-44/

45. HOW MUCH DO YOU USUALLY EARN AT THIS JOB BEFORE DEDUCTIONS? (Enter only one amount)

\$ _____ per hour
\$ _____ per week
\$ _____ per month
\$ _____ per year

45-46/

47-49/

50-53/

54-58/

46. IS YOUR EMPLOYMENT COVERED BY A COLLECTIVE BARGAINING AGREEMENT BY THE UNION AND MANAGEMENT?

Yes 1
No 2

59/

47. IF YOU WERE TO WORK MORE HOURS THAN USUAL DURING SOME WEEK, HOW WOULD YOU BE PAID FOR THESE HOURS?

(Circle only one)

Not paid at all for more hours 1
At your regular rate of pay 2
At more than your regular rate of pay 3
In compensatory time 4

60/

48. HOW MANY HOURS OF OVERTIME DID YOU WORK LAST WEEK?

Number of hours _____
None 00

61-62/

CARD 03

ANSWER Q. 40-52 ONLY IF YOU ARE CURRENTLY WORKING

40. HOW OFTEN IS OVERTIME AVAILABLE TO YOU?

(Circle only one)

- Never 1
Every week 2
Every two weeks 3
Once a month 4
Less than once a month 5

DO NOT
WRITE IN
THIS SPACE

63/

50. TO THE NEAREST YEAR AND MONTH, HOW LONG HAVE YOU HELD THIS JOB?

Years
and
Months

64-65/

66-67/

51. WHAT IS YOUR EMPLOYER'S OVERALL ATTITUDE TOWARDS YOUR PARTICIPATION IN THE GUARD/RESERVE?

(Circle only one)

- Does not apply. I am self employed 0
Very favorable 1
Somewhat favorable 2
Neither favorable nor unfavorable 3
Somewhat unfavorable 4
Very unfavorable 5

68/

52. WHAT IS YOUR EMPLOYER'S LEAVE POLICY FOR YOUR ANNUAL GUARD/RESERVE TRAINING DUTY?

(Circle only one)

- Does not apply. I am self-employed 0
Permits 2 weeks extra vacation leave with pay 1
Permits 2 weeks leave without pay 2
Permits 2 weeks leave but only pays me the difference
between my military and civilian pay 3
My employer will not permit special leave without
pay. I must use my regular vacation 4

69/

TO BE ANSWERED BY EVERYONE.

53. HAVE YOU EVER BEEN REFUSED EMPLOYMENT BECAUSE OF YOUR GUARD/RESERVE MEMBERSHIP OR TRAINING PARTICIPATION?

Yes 1
No 2

70/

54. IN YOUR EMPLOYMENT HAVE YOU EVER BEEN PASSED OVER OR SLOWED IN PROMOTION, DENIED OTHER BENEFITS OR DISCHARGED BECAUSE OF YOUR GUARD/RESERVE MEMBERSHIP OR TRAINING PARTICIPATION?

Yes 1
No 2

71/

V. FAMILY RESOURCES

(Circle only one)

55. ARE YOUR LIVING QUARTERS:

- Owned or being bought by you or someone
in your household 1
Rented for cash 2
Occupied without payment of cash rent 3

72/

CARD 04

DO NOT
WRITE IN
THIS SPACE

56. WHAT ARE YOUR MONTHLY MORTGAGE OR RENTAL PAYMENTS?

Monthly mortgage/rental payments _____
Does not apply, live with parents/relatives. 0000

13-16/

57. DOES YOUR MONTHLY RENTAL PAYMENT INCLUDE UTILITIES?

(Circle only one)

Does not apply, no rental payments. 0
Yes 1
No 2

17/

58. HOW MANY PEOPLE ARE THERE IN YOUR HOUSEHOLD?

Number in household _____

18-19/

59. FOR TAX PURPOSES, HOW MANY DEPENDENTS DO YOU HAVE? Do not include yourself or your spouse.
If none, enter 0

Number of dependents _____

20/

60. DOES YOUR SPOUSE HAVE A PAID JOB, EITHER PART TIME OR FULL TIME?

(Circle only one)

Yes, full time 1
Yes, part time 2
No. 3
Not currently married. 4

21/

61. WHAT WAS THE TOTAL AMOUNT, BEFORE TAXES AND OTHER DEDUCTIONS, THAT YOUR SPOUSE
EARNED IN 1977?

Earnings of spouse _____
Not currently married 00000
Spouse did not work 00001

22-26/

62. HOW MANY PERSONS IN YOUR HOUSEHOLD, INCLUDING YOURSELF AND YOUR SPOUSE EARNED
ANY WAGES IN 1977?

Number of wage earners _____

27/

63. WHAT WAS YOUR TOTAL FAMILY INCOME IN 1977? Include wages of all family members before deductions.
Also include dividends, interest, reserve pay, and any other income received.

(Circle only one)

Under \$3,000 a year 01
\$3,000 to \$5,999 a year 02
\$6,000 to \$7,499 a year 03
\$7,500 to \$8,999 a year 04
\$9,000 to \$9,999 a year 05
\$10,000 to \$10,999 a year 06
\$11,000 to \$11,999 a year 07
\$12,000 to \$12,999 a year 08
\$13,000 to \$13,999 a year 09
\$14,000 to \$14,999 a year 10
\$15,000 to \$15,999 a year 11
\$16,000 to \$17,999 a year 12
\$18,000 to \$18,999 a year 13
\$20,000 to \$24,999 a year 14
\$25,000 and over a year 15

28-29/

CARD 04

DO NOT
WRITE IN
THIS SPACE

84. OVER THE PAST YEAR, HAVE THE FOLLOWING ITEMS INCREASED OR DECREASED FOR YOU OR YOUR FAMILY? Answer for each item.

	Increased	Decreased	No Change
Income from regular job	1	2	3
Expenses due to legal obligation (alimony, etc.)	1	2	3
Unemployment benefits	1	2	3
Time spent in school	1	2	3
Income from self-employment	1	2	3
Income from investments	1	2	3
Extraordinary income (sale of house, insurance policy, inheritance, etc.)	1	2	3
Unusual medical expenses	1	2	3
Transportation costs (include car)	1	2	3

30-38/

85. WHAT WOULD YOU ESTIMATE YOUR TOTAL OUTSTANDING DEBTS TO BE AT THIS TIME?
Exclude mortgage.

(Circle only one)	
No debts	1
\$1 - \$499	2
\$500 - \$1,999	3
\$2,000 - \$4,999	4
\$5,000 - \$9,999	5
\$10,000 - \$14,999	6
\$15,000 or more	7

39/

86. OVER THE PAST YEAR, HOW DIFFICULT HAS IT BEEN TO MEET ORDINARY LIVING EXPENSES?

(Circle only one)	
Very difficult	1
Somewhat difficult	2
Not difficult	3

40/

87. OVER THE PAST YEAR HAVE YOUR DEBTS INCREASED OR DECREASED?

(Circle only one)	
Increased	1
Decreased	2
Stayed the same	3

41/

88. OVER THE PAST YEAR HAVE YOUR SAVINGS INCREASED OR DECREASED?

(Circle only one)	
Increased	1
Decreased	2
Stayed the same	3

42/

89. WHAT IS YOUR SOCIAL SECURITY NUMBER?

--	--	--	--	--	--	--	--	--

43-51/

Thank you for completing this questionnaire.

Appendix D

SURVEY RESPONSE BIAS

The reservists in the experimental sample were chosen from a group of states and regions whose economic and population characteristics and historical reserve reenlistment rates matched the nation as a whole. As a result, the experimental sample of reservists was probably fairly representative of all nonprior service reservists with less than 8 years of service who faced a reenlistment decision in 1978. Thus, if those returning a survey are representative of the experimental sample, the model will be applicable to a similarly defined population in the entire Army Reserve and National Guard.

Of the 15,300 reservists declared eligible for the reenlistment bonus test, approximately 6000 returned usable surveys. If those returning the survey represent the entire sample--that is, if they represent a truly random selection--the coefficients of the reenlistment model estimated from survey data alone may be assumed with a high degree of confidence to contain no survey response bias. However, if the propensity to return a survey depended on either the reenlistment decision itself or on the independent variables significant in the reenlistment model, then straightforward estimation of the coefficients in the reenlistment model will lead to biased results.

If bias exists, several techniques can be used to reduce or eliminate such bias, provided information is available on individuals in the sample universe. Fortunately, the Reserve Enlisted Master Personnel record, containing extensive information on demographic and military

characteristics, was available for all test participants. Analyzing this information in conjunction with information on the survey allowed us to determine the extent of certain kinds of survey bias by statistical testing. This appendix examines these data to determine if survey response bias is present and to describe our strategy for estimating the model to reduce or eliminate such bias.

Linking each survey record with the corresponding reserve master record from the full sample allowed a more systematic exploration of response bias. Of the 6018 surveys returned, we were able to match[1] for 5203 records the survey data and the personnel records from the original experimental sample of 15,300. Since we could analytically investigate the effects of nonresponse for this sample, we used only these surveys in our analysis.

The low response rate encountered in this experiment (approximately 34 percent) typified military surveys administered prior to the experiment. Surveys of active force members administered through service channels had yielded response rates typically between 40 and 60 percent. Reserve surveys would be expected to be somewhat lower. Lower response rates for reservists probably reflect the difficulty of administering surveys in the limited time available to reservists at drills, as well as their part-time commitment to the reserve job.

The survey response rate was not a primary consideration in the test design, since the survey was not central to the bonus evaluation. In fact, the design made survey administration exceedingly difficult. Reservists were located in over 1500 units throughout the United States.

[1] Records were matched on the basis of SSN and demographic variables.

Some units had only a single eligible reservist. Resources were not available for administrative control of this disbursed sample through a system of monitoring individual units. Although the administrative plan called for complete instructions on administration and for a roster of eligible members to be provided to each unit, the actual unit administrative performance was poor.

Survey nonresponse occurred because reservists either did not receive or did not return surveys. Nonreceipt occurred at both the unit and individual levels. Some Guard units initially may not have received survey packets, since all packets were sent first to state offices and then forwarded to units. Survey packets were sent directly to each Army Reserve unit. At the unit level, the surveys probably simply took lower administrative priority among other routine reports and personnel paperwork, so many were not given to reservists.

Administrative personnel turnover during the test accounted in part for the nonreceipt. This is illustrated by the decline in response rate over time (see Table D.1). After an initial increase in response rate in the first 3 months, response declined steadily from 50 to 20 percent. Since surveys and survey lists were distributed only at the beginning of the experiment, whereas individual end-of-term-of-service (ETS) dates were spread over 1 year, it is likely that as time went on more reservists failed to receive surveys.

Other response patterns probably reflect a combination of nonreceipt and nonreturn. Response rates among those who reenlisted were higher than for those separating (see Table D.2). This is probably explained by the greater likelihood of absence (not receiving a survey) from final drills for those separating, as well as less incentive to return surveys actually received.

Table D.1

SURVEY RESPONSE PATTERNS BY MONTH

ETS Month 1978	Response Rate
	(%)
January	42.2
February	45.8
March	50.5
April	43.4
May	39.8
June	33.1
July	32.5
August	30.9
September	28.2
October	23.7
November	20.5
December	19.7

Table D.2

**SURVEY RESPONSE PATTERNS BY REENLISTMENT DECISION
AND BY BONUS AND CONTROL AREA**

Decision	Response Rate (%)		
	Bonus Area	Control Area	Total
Separate	19.1	31.2	26.5
Reenlist	47.3	44.0	45.9
1-year extension	21.4	45.2	43.0
3-year term	46.5	27.0	38.9
6-year term	55.8	52.4	54.8

Survey response patterns also differed in test and control areas among those separating. The response rate among those separating was higher in control areas than in bonus areas. In bonus areas, response rates were low both for those separating and those reenlisting for a single year. One explanation for these results is that a backlash effect occurred in the survey response because of both the reenlistment decision and the bonus decision. Those rejecting a bonus or separating tended to not return surveys. Another explanation is simply that some technicians in bonus areas associated the survey with the bonus, and gave surveys only to those taking the bonus.

These initial response characteristics clearly indicate model coefficients with response bias when using the full sample. In fact, little confidence in any results could be obtained unless the extent of the bias is systematically identified and eliminated. Three strategies were considered to eliminate the bias: weighting, statistical estimation incorporating the survey response equation (Heckman technique[2]), and the use of an unbiased subsample. The third was chosen, since statistical tests of survey response bias showed that a large subsample for which administrative procedures and reenlistment incentives were uniform had no response bias.

[2] James J. Heckman, "Sample Selection Bias as a Specification Error," Econometrica 47 (January 1979), pp. 153-161. Although extensive work was done using the Heckman technique on the full experimental sample to attempt to correct for survey bias, the results were unsuccessful. One reason is that the Heckman technique has been derived rigorously only for the situation where the dependent and independent variables can take continuous values; using it in the situation where the variables are dichotomous means stretching its applicability. As far as we know, no one has formally derived a parallel to the Heckman technique for the case of dichotomous variables.

If nonresponse bias is present, the expected value of the coefficient of the model estimated on the survey respondent sample of 5203 would differ from the coefficient obtained on the sample of 15,300. While coefficients might vary simply because of random variation, a pattern of highly significant differences among several coefficients provides strong evidence for nonresponse bias. Although we cannot test the complete set of variables used in the model for nonresponse bias since many appear only on the survey record, we can test for the set of demographic and military characteristic variables available on the personnel tapes. Most hypotheses concerning administrative or individual nonresponse would posit differences in coefficients contained on the full sample. Thus, if these coefficients of regressions performed on these two samples show equal coefficients, most hypotheses concerning presence of nonresponse bias can be eliminated. Although these tests cannot eliminate the possibility that certain variables appearing only on the survey contain nonresponse bias, it is considerably more difficult to find a hypothesis accounting for bias on a survey variable that would not also appear in one of the demographic and military characteristic variables contained on all records.

To test this notion for a single independent variable, two regression equations were estimated on the full 15,300 sample.[3] In one equation, the estimated coefficient associated with that independent variable can take on different values for reservists who did and did not return surveys; in the second regression equation, the estimated

[3] Franklin M. Fisher, "Tests of Equality between Sets of Coefficients in Two Linear Regressions: An Expository Note," Econometrica 38 (March 1970), pp. 364-365.

coefficient is restricted to one value. So, the second equation embodies the notion that reservists who returned a survey and reservists who did not return one responded in the same way to changes in the independent variable; it implies that the survey population is not biased with regard to the independent variable.

We can test this notion by looking at how much of the total variations in the dependent variable cannot be explained by the two regression equations. If the second equation leaves unexplained much more of the total variance, then we can reject the idea that the coefficient's true values are equal for survey respondents and for nonrespondents; rejecting the notion implies that the samples are biased with regard to the independent variable. A statistical F-test is used to determine whether the change in unexplained variance is significant. The F-test for each of the independent variables available for the entire experimental population are given in the first column of Table D.3. Our results suggest considerable survey response bias among the total sample of survey respondents. The offer of a reenlistment bonus, the reservist's pay grade, race, combat job, and marital status proved to be sources of bias.

The results clearly imply that the presence of a bonus significantly changed the survey response pattern, either by affecting the administrative channels for survey distribution or by affecting individual members' propensity to return surveys. These results also indicate that less bias would probably exist where both special financial incentives and survey administrative modes were held constant. The surveys collected in the National Guard in experimental control areas constituted the largest subsample in which both financial

Table D.3

TESTING FOR IDENTICAL RESPONSES: FULL SAMPLE VS. SUBSAMPLE

Variable	Reenlistment Decision F-tests	
	Full Sample ^a	Guard/Control Subsample ^b
Bonus available	61.98 ^c	---
Pay grade	6.65 ^c	1.35
Component	0.58	---
First term	0.32	3.55
First term/male	2.08	1.13
Draft motivation	1.88	0.02
Combat job	4.96 ^d	1.70
Length of first term	0.01	2.50
Year of birth	0.05	1.18
Sex: female	1.56	0.51
Race: black	9.82 ^c	1.73
Currently married	3.92 ^d	0.17
Number of dependents	0.60	0.23
College graduate	0.03	0.88
Intercept	5.20 ^d	7.66 ^c
All variables	55.34 ^c	19.17 ^c

^aThe F-tests have 1 and 15,102 degrees of freedom for individual variables and 13 and 15,090 degrees of freedom for all variables.

^bThe F-tests have 1 and 6840 degrees of freedom for individual variables and 13 and 6828 degrees of freedom for all variables.

^cThere is less than one chance in 100 that the true coefficients for survey respondents and nonrespondents are equal.

^dThere is less than one chance in 20 that the true coefficients for the survey respondents are equal.

incentives and survey administrative modes were similar.

Similar tests for this subsample (see column 2 of Table D.3) show no survey response bias for any variable coefficient. Only the estimated intercept term for survey respondents and nonrespondents differ significantly. But, differences in the intercept can be easily adjusted

under the assumption of a choice-based sample.[4] The absence of bias in the latter case means that estimation can proceed for this subsample without reweighting.

Although the final model was estimated for the Guard/Control group, the significant results or conclusions of this report would not have changed had the full survey sample (15,300) been used. Table D.4 compares estimates from linear OLS regressions on the full sample and Guard/Control sample. As can be seen, the coefficients of the reserve wage, civilian hours worked, and civilian wage variables change little between the two samples.

[4] See James R. Hosek, An Introduction to Estimation with Choice-Based Sample Data, The Rand Corporation, P-6131, July 1979.

Table D.4

THE REENLISTMENT DECISION: COMPARISON OF RESULTS FOR THE
FULL SAMPLE AND GUARD/CONTROL SUBSAMPLE USING A LINEAR MODEL

Variable	Full Sample		Guard/Control	
	Coefficient	t-Ratio	Coefficient	t-Ratio
Reserve pay and time				
Annual net drill and camp pay	0.363×10^{-4}	1.90	0.440×10^{-4}	1.70
Net reserve time	0.245×10^{-2}	1.59	-0.549×10^{-3}	-0.24
Reserve experience				
Pay grade E3 or below	-0.886×10^{-1}	- 2.91	-0.910×10^{-1}	-2.36
Pay grade E5	0.133	9.52	0.133	7.24
Pay grade E6	0.232	10.53	0.217	7.04
Pay grade E7 or above	0.297	4.40	0.449	3.35
Component: National Guard	-0.471×10^{-1}	- 2.56	—	—
Combat job	-0.624×10^{-1}	- 4.66	-0.651×10^{-1}	-3.74
Years of service	-0.129×10^{-1}	- 3.60	-0.153×10^{-1}	-3.69
Revealed reserve preferences				
Draft motivation	-0.185	-10.38	-0.125	-5.05
Prior reenlistment	0.164	9.53	0.192	7.79
Civilian work environment				
Free time	0.245×10^{-2}	1.59	0.193×10^{-2}	2.15
Civilian hourly wage	-0.136×10^{-1}	- 5.51	-0.126×10^{-1}	-3.64
Availability of paid overtime	-0.581×10^{-3}	- 1.96	-0.894×10^{-3}	-2.22
Must use vacation	-0.703×10^{-1}	- 2.30	-0.514×10^{-1}	-1.16
Employer's attitude	-0.418×10^{-1}	- 7.29	-0.476×10^{-1}	-6.02
Federal government employment	-0.676×10^{-2}	- 0.21	-0.349×10^{-2}	-0.07
State/local government employment	0.489×10^{-1}	1.92	0.604×10^{-1}	1.67
Middle-sized firm employment	0.302×10^{-1}	1.54	0.176×10^{-1}	0.66
Small firm employment	0.29×10^{-2}	1.77	0.415×10^{-1}	1.86
Self-employed	0.801×10^{-5}	0.25	-0.481×10^{-5}	-1.04
Spouse's annual earnings	-0.243×10^{-5}	- 1.75	-0.166×10^{-5}	-0.72
Individual characteristics				
Sex: female	0.504×10^{-1}	1.94	0.144	2.83
Race: black	0.165	6.09	0.200	5.30
Age	0.110×10^{-1}	5.76	0.120×10^{-2}	4.30
Married	-0.138×10^{-1}	- 0.81	-0.297×10^{-1}	-0.12
Number in household	0.118×10^{-1}	2.68	0.115×10^{-1}	1.64
Not high-school graduate	0.475×10^{-1}	2.37	0.382×10^{-1}	1.47
College graduate	-0.795×10^{-1}	- 4.64	-0.922×10^{-1}	-3.73
Regional characteristics				
Middle-sized urban area	0.691×10^{-2}	0.35	-0.127×10^{-1}	-0.44
Small urban area	-0.126×10^{-1}	- 0.62	-0.201×10^{-1}	-0.68
Rural area	-0.401×10^{-2}	- 0.19	-0.138×10^{-1}	-0.45
Suburban area	0.572×10^{-3}	0.03	0.202×10^{-1}	0.73
1978/1977 local inflation factor	-0.294	- 0.57	0.197	0.26

Table D.4

CONTINUED

Variable	Full Sample		Guard/Control	
	Coefficient	t-Ratio	Coefficient	t-Ratio
Missing value indicator variables (MVIV)				
Annual net drill and camp pay	-0.607×10^{-2}	-0.18	-0.254×10^{-1}	-0.56
Net reserve time	0.789×10^{-1}	1.41	0.462×10^{-1}	0.57
Draft motivation	-0.121×10^{-1}	-0.17	-0.335×10^{-1}	-0.23
Prior reenlistment	-0.396×10^{-1}	-0.49	0.502×10^{-1}	0.32
Free time	0.194	3.16	0.180	2.06
Civilian hourly wage	-0.152	-5.48	-0.102	-2.64
Availability of paid overtime	-0.144×10^{-1}	-0.47	-0.751×10^{-1}	-1.76
Must use vacation	-0.296×10^{-1}	-0.76	-0.272×10^{-1}	-0.49
Employer's attitude	-0.132	-3.45	-0.185	-3.33
Kind of employer	0.167	4.52	0.151	2.98
Spouse's income	-0.420×10^{-1}	-1.62	-0.597×10^{-1}	-1.66
Married	0.587×10^{-1}	1.46	0.943	1.74
Number in household	-0.353×10^{-1}	-1.52	-0.378×10^{-1}	-1.13
Education	-0.437×10^{-1}	-1.59	-0.566×10^{-1}	-1.49
Residential area	-0.953×10^{-1}	-1.33	0.132×10^{-2}	0.11
Intercept	0.409	1.86	0.742×10^{-2}	0.01
Number of observations	5203		2876	
Mean square error		0.181		0.192
R ²		0.28		0.24
F-ratio		39.14		18.92
Chi-squared		NA		NA

Appendix E

VARIABLE DEFINITIONS

This appendix defines the variables used in the analysis and the sources of data used for these definitions.

DATA SOURCES

Data in this analysis came from five sources. Most of the data needed to compute values for our variables came from information in reservists' responses to the 1978 Selected Reserve Reenlistment Bonus Test survey. During the experiment, administrative data were also collected from participating units regarding reenlistment decisions of reservists. We supplemented this basic data source with information from the center personnel file record for each reservist. The administrative and personnel records are described in Appendix B and the survey instrument and procedures in Appendix C. Information on actual drill and summer camp pay and on urban and regional price levels was used to compute income variables.

Administrative and Survey Records

Starting with the administrative RPMF survey, we selected the records for which we had both an administrative record and survey record for eligible recipients. These selection criteria yielded 5216 records.

Pay Data. To calculate Guard pay, we used the pay rates effective on October 1, 1977, as shown in the 1978 National Guard Almanac. [1]

[1] 1978 National Guard Almanac, Lt. Col. Sol Gordon and Capt. Clint Tennill, eds., Uniformed Services Almanac, Inc., P.O. Box 76, Washington, D.C., 1978, pp. 10-11.

Price Level Data. Our formal model calls for all the dollar-dominated variables to take into account differences in the levels of average prices facing the reservists; all the dollar-dominated variables should be expressed in dollars with the same purchasing power. A variable reflecting the proportional change in the level of average prices--an inflation rate variable--was also included as an independent variable. Thus, regional price level data were required not only to adjust dollar-dominated variables but also to calculate the inflation rate variable.

The U.S. Bureau of Labor Statistics provides annual estimates of the family income required to purchase the same market basket of goods and services in 40 metropolitan areas and nonmetropolitan urban areas in four regions; an estimate reflecting average prices for all urban areas in the United States is also provided. Estimates are made for three different "market baskets" of goods and services, said to reflect low, intermediate, and high standards of living for a family of four. The required incomes reflect prices and taxes in the autumn of each year.

Since all the income information reported on our survey instrument is for calendar 1977, we used the estimates that reflected autumn 1977 prices to calculate our regional price adjustment factors.[2] The regional price adjustment factors were calculated by dividing the income necessary to purchase the intermediate market basket in each metropolitan area or region by the income necessary to purchase the budget at average U.S. prices. This process yielded the regional price adjustment factors given in the first column of Table E.1.

[2] United States Department of Labor, Bureau of Labor Statistics, "Autumn 1977 Urban Family Budgets and Comparative Indexes for Selected Urban Areas" (news release), Washington, D.C., April 26, 1978.

Table E.1

REGIONAL PRICE ADJUSTMENT AND INFLATION FACTORS

State	Area	Regional Price Adjustment Factor	Regional Inflation Factor
Colorado	Denver	1.00	1.10
	Other	0.90	1.13
Connecticut	Hartford	1.04	1.09
	Other	1.00	1.10
Georgia	Atlanta	0.91	1.09
	Other	0.85	1.11
Idaho	All	0.90	1.13
Iowa	Cedar Rapids	0.98	1.09
	Other	0.92	1.11
Kansas	Kansas City	0.96	1.10
	Wichita	0.93	1.11
	Other	0.92	1.11
Maine	Portland	1.03	1.09
	Other	1.00	1.10
Massachusetts	Boston	1.20	1.07
	Other	1.00	1.10
Michigan	Detroit	1.02	1.10
	Other	0.92	1.10
Minnesota	Minneapolis-		
	St. Paul	1.04	1.09
	Other	0.92	1.11
Montana	All	0.90	1.13
Nebraska	Omaha	0.96	1.10
	Other	0.92	1.11
New Hampshire	All	1.00	1.10

Table E.1--continued

New Jersey	Northeast NJ	1.17	1.08
	Philadelphia	1.04	1.09
	Other	1.00	1.10
New York	New York	1.17	1.08
	Buffalo	1.07	1.07
	Other	1.00	1.10
North Carolina	Durham	0.96	1.10
	Other	1.00	1.11
North Dakota	All	0.92	1.11
Pennsylvania	Lancaster	0.95	1.10
	Philadelphia	1.04	1.09
	Pittsburgh	0.97	1.09
	Other	1.00	1.10
Ohio	Cincinnati	0.97	1.11
	Cleveland	1.02	1.09
	Dayton	0.92	1.11
	Other	0.92	1.11
Oregon	All	0.90	1.13
Rhode Island	All	1.00	1.10
South Carolina	All	0.85	1.11
Utah	All	0.90	1.13
Vermont	All	1.00	1.10
Washington	Seattle-Everett	1.01	1.08
	Other	0.90	1.13
West Virginia	Wheeling	0.97	1.09
	Other	0.85	1.11
Wisconsin	Milwaukee	1.07	1.10
	Green Bay	0.98	1.10
	Other	0.92	1.11
Wyoming	All	0.90	1.13

The regional inflation factors were obtained by dividing the nominal income needed to purchase the intermediate budget in autumn 1978 by the nominal income needed to purchase the same intermediate budget in autumn 1977.[3] The regional inflation factors are given in the second column of Table E.1.

A regional price adjustment factor and a regional inflation factor were associated with each reservist's record on the basis of his unit's zip code. If his unit was located in one of the 40 metropolitan areas, that area's factors were associated with the reservist's record. If his unit was located outside the 40 metropolitan areas, one of the four regional sets of factors was chosen. Our method of assigning factors might have led to the wrong factors being assigned if, for example, the reservist lived far from his unit's location. We would have preferred to have used factors based on the reservist's residential location but could not do so because we did not have complete residential zip code information.

VARIABLE DEFINITIONS

Our description of each variable includes its definition, the assumptions needed to calculate its value, and the computational procedures. We will deal with the variables under five headings: reenlistment option, civilian job, changes since last reserve participation decision, reservist's personal characteristics, and regional characteristics. Most of the information used to get values for the variables come from the survey instrument. A response to a

[3] U.S. Department of Labor, Bureau of Labor Statistics, "Autumn 1978 Urban Family Budgets and Comparative Indexes for Selected Urban Areas" (news release), Washington, D.C., April 29, 1979.

particular question is indicated by Q followed by the number of the question; Q14 stands for the response to question 14.

The Reenlistment Option

Bonus Available. An indicator variable that takes on the value of 1 if the reservist is eligible to receive a bonus for reenlisting for 3 or 6 years.

Assumptions: None.

Computations:

- A. If the reservist is in the test group, $BONUS = 1$.
- B. If the reservist is in the control group, $BONUS = 0$.

Annual Net Drill and Summer Camp Pay. A reservist's annual net drill and summer camp pay equals his compensation for attending the full number of drills authorized for his unit plus a 14-day summer camp less any loss of earnings from his regular job due to attending summer camp. The annual net reserve drill and summer camp pay variable includes an adjustment by the regional price factor so that it reflects real differences in purchasing power.

Assumptions:

- A. If the pay grades given on the reserve personnel file and survey file do not agree, the pay grade on the survey is correct.
- B. The number of authorized drills is used to compute annual drill pay.
- C. Only individuals who work can lose income by attending summer camp.

- D. All part-time workers are employed for a fraction of a week but work year-round.

Computations:

- A. Enter table of 1978 drill pay (DP) for enlisted personnel. Drill pay depends on pay grade and years of service. To associate a particular drill pay with an individual, use the variable "Analytic Pay Grade Survey" and take years of service from the section of question 9.
- B. Enter "Daily Quarter Rate with Kin (DQRWK)." Assign to individual according to "Analytic Pay Grade Survey."
- C. Define A as = 48 if Q14 = 1; = 24 if Q14 = 2.
- D. Define B as a dummy indicating marital status.
B = 1 if Q35 = 1 (married).
B = 0 if Q35 = 2, 3, 4, or 5 (not married).
- E. Calculate Annual Drill Pay (ADP) as
 $ADP = (A) \times (DP).$
- F. Calculate SCP as
 $SCP = 14[DP + (B)(DQRWK)].$
- G. Calculate Annual Reserve Pay Less Civilian Income Loss (ARPCIL) as follows:
- If Q40 = 1 or 2 and Q52 = 0 or 2,
 $ARPCIL = ADP + SCP - (0.0385) (AIPJ)$
(AIPJ is defined below under Civilian Hourly Wage Rate).
 - If Q40 = 1 or 2 and Q52 = 1 or 4,
 $ARPCIL = ADP + SCP.$
 - If Q40 = 1 or 2 and Q52 = 3,
 $ARPCIL = ADP.$

d. If $Q40 = 3, 4, 5, 6$ or 8 , $ARPCIL = ADP + SCP$.

H. Annual Net Drill and Summer Camp Pay (ANDSCP) is defined as

$$ANDSCP = \frac{ARPCIL}{RPAF},$$

where RPAF stands for the Reciprocal Price Adjustment Factor.

Net Reserve Time (NRT). The number of days per year that the reservist is required to devote to monthly drills, summer camp, and travel to and from reserve meetings less any reduction in the number of days worked on the reservist's regular job due to reserve participation.

Assumptions:

- A. Two paid drills per man-day.
- B. Travel time can be expressed on an equivalent-day basis.
- C. If a person can reduce his work time to go to summer camp, he will do so rather than reduce his free time.
- D. Summer camp takes 14 days.

Computations:

- A. If $Q14 = 1$, then $A = 24$.
If $Q14 = 2$, then $A = 12$.
- B. $B = [(Q17) \times (A)]/480$.
- C. If $Q40 = 1$ or 2 and if $Q52 = 0, 1, 2$, or 3 , then $C = 0$.
If $Q40 = 1$ or 2 and if $Q52 = 4$, then $C = 14$.
If $Q40 = 3, 4, 5, 6$ or 8 , then $C = 14$.
- D. $NRT = A + B + C$.

Pay Grade E3 or Below (PG3). An indicator variable that takes on the value of 1 if the reservist's rank is E1, E2, or E3. Otherwise, its value is 0.

Assumption:

If the pay grades given on the reserve personnel file and the survey file do not agree, the pay grade on the survey is correct.

Computation:

If the variable "Analytic Pay Grade Survey" equals 1, 2, or 3, then PG3 = 1. Otherwise, PG3 = 0.

Pay Grade E5 (PG5). An indicator variable that takes on the value of 1 if the reservist's rank is E5. Otherwise, its value is 0.

Assumption:

If the pay grades given on the reserve personnel file and survey file do not agree, the pay grade from the survey is correct.

Computation:

If the variable "Analytic Pay Grade Survey" equals 5, then PG5 = 1. Otherwise, PG5 = 0.

Pay Grade E6 (PG6). An indicator variable that takes on the value of 1 if the reservist's rank is E6. Otherwise, its value is 0.

Assumption:

If the pay grades given on the reserve personnel file and survey file do not agree, the pay grade on the survey is correct.

Computation:

If the variable "Analytic Pay Grade Survey" equals 6, then PG6 = 1.

Otherwise, PG6 = 0.

Pay Grade E7 Above (PG7). An indicator variable that takes on the value of 1 if the reservist's rank is E7, E8, or E9. Otherwise, its value is 0.

Assumption:

If the pay grades given on the reserve personnel file and survey file do not agree, the pay grade on the survey is correct.

Computation:

If the variable "Analytic Pay Grade" equals 7, 8, or 9, then PG7 = 1.

Otherwise, PG7 = 0.

Combat Job (COMMOS). This indicator variable equals 1 if the reservist has a combat job; otherwise, it is 0.

Assumptions: None.

Computations:

- A. Read first two digits of MOS.
 - a. Use current MOS from survey if it is available (Q12).
 - b. If response to Q12 is missing or "don't know," use duty MOS from personnel file.
 - c. If responses to Q12 and duty MOS are missing, use PMOS from personnel file.

d. If a, b, and c are all missing, treat COMMOS as missing.

B. Where we have an MOS,

If first two digits = 11, 12, or 13, COMMOS = 1.

Otherwise, COMMOS = 0.

Component (COMP). This indicator variable equals 0 if the reservist is in the Army Reserve and 1 if he is in the Army National Guard.

Assumptions: None.

Computations:

A. Read ANAL.COMP. variable.

B. If ANAL.COMP = 1, COMP = 1.

If ANAL.COMP = 2, COMP = 0.

The Civilian Job

Civilian Hourly Wage Rate (CHWR). Earnings per hour from primary job before overtime.

Assumptions:

A. If a person's primary activity is "Unemployed/laid off," "full-time student," "part-time student," "keeping house," or "other," he does not have a primary job.

B. All part-time workers are employed for a fraction of a week but work all year.

C. No one works more than 40 hours a week before overtime.

Computations:

A. If Q40 = 1 or 2,

a. Compute hours worked (HW) as follows:

If Q44 is less than 40, $HW = Q44$.

If Q44 is more than 40, $HW = 40$.

b. Compute annual income from primary job (AIPJ) as follows:

If Q45 was answered as "per hour," $AIPJ = (Q45) \times (HW) \times$

52.

If Q45 was answered as "per week," $AIPJ = (Q45) \times 52$.

If Q45 was answered as "per month," $AIPJ = (Q45) \times 12$.

If Q45 was answered as "per year," $AIPJ = Q45$.

c. Compute primary job pay per hour:

$$CHWA = AIPJ / (RPAF \times HW \times 52)$$

where, RPAF stands for the Regional Price Adjustment Factor.

B. If Q40 = 3, 4, 5, 6, or 8, then $CHWA = 0$.

Free Time (FT). The number of hours per week that the reservist has free after putting in the usual number of hours on his regular job and sleeping 7 hours a night.[4]

Assumption: 17 usable hours a day.

Computation:

A. If Q40 = 1 or 2, then $FT = 119 - Q44$.

[4] The Free Time variable corresponds to the Hour-Worked-per-Week variable in Section IV, since the former is defined as a constant value less the latter.

8. If $Q40 = 3, 4, 5, 6, \text{ or } 8$, then $FT = 119$.

Week Paid Overtime Available (WPOA). Number of weeks per year in which paid overtime is available from the primary job.

Assumptions: None.

Computations:

A. If $Q40 = 1 \text{ or } 2$ and if $Q47 = 2 \text{ or } 3$, then

a. If $Q49 = 1$, $APOT = 0$.

b. If $Q49 = 2$, $APOT = 52$.

c. If $Q49 = 3$, $APOT = 26$.

d. If $Q49 = 4$, $APOT = 12$.

e. If $Q49 = 5$, $APOT = 6$.

B. If $Q40 = 1 \text{ or } 2$ and $Q47 = 1 \text{ or } 4$, or

if $Q40 = 3, 4, 5, 6, \text{ or } 8$, $APOT = 0$.

Middle-Sized Private Firm (MSPF). Indicator variable equals 1 if the reservist is employed by a civilian firm with 100 to 500 employees. Otherwise, it equals 0.

Assumptions: None.

Computation:

If $Q40 = 1 \text{ or } 2$ and $Q42 = 6$, then $MSPF = 1$.

Otherwise, $MSPF = 0$.

Small-Private Firm (SPF). Indicator variable equals 1 if the reservist is employed by a civilian firm with less than 100 employees. Otherwise, it equals 0.

Assumptions: None.

Computation:

If $Q40 = 1$ or 2 and $Q42 = 7$, then $SPF = 1$.

Otherwise, $SPF = 0$.

Self-Employed (SE). Indicator variable equals 1 if the reservist is self-employed. Otherwise, it equals 0.

Assumptions: None.

Computation:

If $Q40 = 1$ or 2 and $Q42 = 2$, $SE = 1$.

Otherwise, $SE = 0$.

Federal Government (FG). Indicator variable equals 1 if the reservist works for the federal government. Otherwise, it equals 0.

Assumptions: None.

Computation:

If $Q40 = 1$ or 2 and $Q42 = 1$, then $FG = 1$.

Otherwise, $FG = 0$.

State and Local Government (SLG). Indicator variable equals 1 if the reservist works for a state or local government. Otherwise, it equals 0.

Assumptions: None.

Computation:

If Q40 = 1 or 2 and Q42 = 2 or 3, SLG = 1.

Otherwise, SLG = 0.

Employer's Attitude (EA). An indicator variable that is assigned a value between 1 and 5, depending on the reservist's subjective perception and evaluation of his employer's attitude towards his reserve participation. If the reservist indicates that his employer's attitude is "very favorable," the indicator variable is assigned the value of 1; if the reservist indicates that his employer's attitude is "very unfavorable," the indicator is assigned the value 5. Intermediate evaluations are assigned values 2, 3, and 4.

Assumptions:

- A. A reservist's subjective evaluation of his employer's attitude can be meaningfully expressed on a cardinal number scale.
- B. Self-employed persons are assigned the value of 2. (An employed person would be assigned the value 2 if he judged that his employer was "somewhat favorable" to his participation in the reserve.)

Computation:

If Q51 = 1, EA = 1.

If Q51 = 0 or 2, EA = 2.

If Q51 = 3, EA = 3.

If Q51 = 4, EA = 4.

If Q51 = 5, EA = 5.

Employer's Summer Camp Policy (ESCP). An indicator variable that takes on the value of 1 if an employed reservist cannot take extra leave to attend summer camp; such a reservist must use his regular vacation time. Otherwise, this variable is 0.

Assumptions: None.

Computation:

If Q40 = 1 or 2 and if Q52 = 4, then ESCP = 1.

Otherwise, ESCP = 0.

Changes Since Last Reserve Participation Decision

Initial Enlistment Alternative (IEA). An indicator variable equal to 1 if the reservist first entered military service because he was drafted for active duty or to avoid being drafted. Otherwise, this variable is 0.

Assumption: A person is draft motivated if he indicated on the survey instrument that he first entered military service by the draft or to avoid being drafted and if he has not reenlisted in the National Guard or Army Reserve.

Computation:

If $Q6 = 1$ or 2 and if $Q7 = 0$, then $IEA = 1$.

Otherwise, $IEA = 0$.

Last Decision: Reenlistment vs Enlistment (PA). An indicator variable equal to 1 if the reservist had previously reenlisted in the reserve.

Assumptions: None.

Computation:

If $Q7 = 0$, then $PA = 0$.

If $Q7 = 1, 2, 3, 4$, or 6 , then $PA = 1$.

Years of Service (YOS). Including initial active duty for training, the number of years that the reservist has served in the Army Reserve or National Guard.

Assumptions: None.

Computation: $YOS = Q9$.

The Reservist's Personal Characteristics

Age (AGE). The reservist's age when his current term of service ends.

Assumptions:

- A. If a reservist's day and month of birth on our administrative records differ from his survey response, his survey response is correct.
- B. If a reservist's year of birth on our administrative records differs from his survey response, and if only one of the dates is between 1935 and 1958, the date in that interval is correct. If both years fall into the interval, then our administrative record is correct.

Computations:

- A. DOBY stands for year of birth.
- B. Calculate $B = 78 - \text{DOBY}$.
- C. Let ETSM stand for month of ETS and DOBM stand for month of birth.
- D. Compute DOBM and ETSM:
 - a. If DOBM is greater than ETSM, then $\text{AGE} = B - 1$.
 - b. If $\text{DOBM} = \text{ETSM}$, go to Step F.
 - c. If DOBM is smaller than ETSM, then $\text{AGE} = B$.
- E. Let ETSD stand for date of ETS and DOBD stand for date of birth.
- F. If DOBD is greater than ETSD, the $\text{AGE} = B - 1$.
If $\text{DOBD} < \text{ETSD}$, then $\text{AGE} = B$.

Race (BLACK). Indicator variable equals 1 if the reservist is black.

Assumptions: None.

Computation: Use the RACE variable from the reserve personnel master file.

If RACE = 1 or 3, BLACK = 0.

If RACE = 2, BLACK = 1.

Sex (SEX). Indicator variable equals 1 if the reservist is female.

Assumptions: None.

Computation: Use the ANAL.SEX variable from the reserve personnel master file.

If ANAL.SEX = 1, SEX = 0.

If ANAL.SEX = 2, SEX = 1.

Marital Status (MS). An indicator variable equal to 1 if the respondent is married. Otherwise, it is 0.

Assumptions: None.

Computation:

If Q35 = 1, then MS = 1.

Otherwise, MS = 0.

Spouse's Annual Earnings (SAE). Spouse's 1977 earnings, if any.

Assumptions: None.

Computation:

If $Q35 = 1$ and $Q60 = 1$ or 2 , then $SAE = (Q61/RPAF)$.

Otherwise, $SAE = 0$.

Number In Household (NIH). Number of people in the respondent's household.

Assumptions: None.

Computation: $NIH = Q58$.

Education: Not a High-School Graduate (NHSD). An indicator variable equal to 1 if the respondent did not receive a high-school diploma.

Assumption: A respondent who has earned a CED diploma is not considered a high-school graduate.

Computation:

If $Q38 = 0$ or 11 , then $NHSD = 1$.

Otherwise, $NHSD = 0$.

Education: College Graduate (CG). An indicator variable equal to 1 if the respondent has a baccalaureate or higher degree from a college or university. Otherwise, it is 0.

Assumptions: None.

Computation:

If $Q38 = 16, 18, \text{ or } 20$, then $CG = 1$.

Otherwise, $CG = 0$.

Regional Characteristics

Middle-sized City (MC). An indicator variable equal to 1 if the respondent lives in a city of 50,000 to 250,000 population or in a suburb near such a city. Otherwise, it is 0.

Assumptions: None.

Computation:

If Q39 = 3 or 4, then MC = 1.

Otherwise, MC = 0.

Small City (SC). An indicator variable equal to 1 if the respondent lives in a city or town with a population of less than 50,000. Otherwise, it is 0.

Assumptions: None.

Computation:

If Q39 = 5, then SC = 1.

Otherwise, SC = 0.

Rural (RU). An indicator variable equal to 1 if the respondent lives in a rural area. Otherwise, it is 0.

Assumptions: None.

Computation:

If Q39 = 6 or 7, then $RU = 1$.

Otherwise, $RU = 0$.

Suburb (SUB). An indicator variable equal to 1 if the respondent lives in a suburb of a city with a population of 50,000 or more. Otherwise, it is 0.

Assumptions: None.

Computation:

If Q39 = 2 or 4, then $SUB = 1$.

Otherwise, $SUB = 0$.

Regional Inflation Factor (RIF). The ratio of the income needed to purchase a mid-level budget in fall 1978 to the income necessary to purchase the same budget in fall 1977.

Assumptions: See above.

Computation: None.

Appendix F

MISSING VALUES

Not all the surveys were filled out completely. Because many lacked responses to one or more questions that we had to use, we could not calculate all the values of some variables in our analysis. When only a small percentage of the observations lacked values for a variable, we filled in the missing values with the mean of the available values. Three independent variables--years of service, age, and pay grade dummy--were missing less than 2 percent of their values. So few missing observations means that lack of randomness among the missing values is not a major concern. We inserted the mean values of the observed age and years-of-service variables for their respective missing values and assumed that the missing pay grades were E4s.

When values were missing for a larger percentage of the observations, we created a missing value indicator variable. When a value for the variable was available, its missing value indicator variable was set equal to zero. When a value was not available, the variable was assigned the value of zero and its missing value indicator variable was assigned the value of one. We chose this way to deal with the most serious missing value problems because it allowed us to use all the information available and it provided a means of finding out whether values were missing in a random way.[1] Our missing value indicator variable can be seen at the bottom of Tables 12 and D.4.

[1] Winston K. Chow, A Look at Various Estimators in Logistic Models in the Presence of Missing Values, The Rand Corporation, N-1324-HEW, October 1979.

Let X_i be an independent variable, b_i its estimated regression coefficient, I_i its associated missing value indicator variable, and c_i the indicator variable's estimated regression coefficient. We can write a part of the right-hand side of the regression equation as

$$b_i X_i + c_i I_i .$$

This expression reduces to $b_i X_i$ when a value for the independent variable is available; it reduces to c_i when a value is not available.

Let \bar{X}_i stand for the mean of the observed X_i 's. If values of X_i are missing randomly, the expression $b_i \bar{X}_i^a$ should be about equal to c_i . In other words, the assumption of values missing in a random way implies that:

$$\bar{X}_i^a \approx \frac{c_i}{b_i} \equiv \bar{X}_i^i .$$

An implied mean of the missing values (\bar{X}_i^i) may be compared to the actual mean of the observed X_i 's. If the actual mean and the implied mean turn out to be significantly different, then the assumption that values of X_i are missing randomly does not hold up. The difference between the actual means of the observed values and implied means of the missing values are compared in Table F.1. These means reflect the Guard/Control subsample and maximum likelihood logit regression given in Table 12. The results suggest substantial item response bias for net reserve pay, net reserve time, availability of overtime, employer's attitude, and spouse's earnings.

Table F.1

ITEM RESPONSE BIAS ANALYSIS

Variable	Percentage of Missing Observations	Unit	Mean of Observed Values	Implied Mean or Values
Reserve net pay	20.9	\$ per year	871.30	-896.67
Net reserve time	10.2	Days per year	26.46	-822.83
Free time	5.9	Hours per week	77.06	90.11
Civilian hourly earnings	20.7	\$ per hour	6.68	7.39
Availability of overtime	8.6	Weeks per year	24.92	86.97
Employer's attitude	7.7	Scale of 1 to 5	2.45	3.92
Spouse's earnings	15.6	\$ per year	2,581	40,794

Appendix G

PAY GRADE VARIABLES

Our basic equation in Table 11 includes not only the annual-net-drill-and-camp-pay (ANDACP) variable but also a set of pay grade indicator variables. When we were doing the econometric analysis, we were not sure whether we should include the pay-grade-indicator variables in our basic equation. However, the decision had more than technical interest; when the pay-grade-indicator variables were included, our estimate of the ANDACP variable's coefficient dropped 40 percent and became much less significant. Here we outline how we decided to include the pay-grade-indicator variables in our basic equation.

From the outset of our analysis, we recognized that one way in which a reservist's pay grade influenced his decisions to reenlist is through monetary compensation--the ANDACP variable.[1] But, whether we also should include the pay-grade-indicator variables seemed to depend on whether a reservist's pay grade also influenced his reenlistment decisions in other ways. (For example, if a reservist's pay grade indicates his relative status in his unit and if higher status would make him more likely to reenlist, then pay grade would have an influence separate from its influence through monetary compensation.)

[1] It is not possible to compute a simple correlation coefficient between the ANDACP variable and our set of pay-grade variables. But, it is possible to compute a correlation coefficient between the ANDACP variable and a single variable that takes on the value of the reservist's pay grade. For all the usable survey responses, the value of the estimated calculation coefficient is 0.17, but it is significantly different from zero at the 1 percent level.

If pay grade influenced reenlistment decisions only through its effect on monetary compensation, then a set of pay-grade-indicator variables would be redundant and could dilute the estimates of the impact of monetary compensation by dividing it arbitrarily among several variables. But, if a reservist's pay grade also influenced his reenlistment decision in ways other than monetary compensation, the failure to include the set of pay-grade-indicator variables would mean that our estimate of the ANDACP variable coefficient might be subject to missing variables bias and we might be overestimating the impact of monetary compensation.

We used an F-test to decide whether reserve pay grades had a separate effect on reenlistment decisions and, therefore, should be included in our basic equation. The notion that pay grades do not have a separate impact implies that the true values of their coefficients in our basic equation are all zero. We can test the hypothesis that the true values of the coefficients are zero with an F-test.[2] If the value of the F-test indicates that it is most unlikely that the true value of the coefficients of the pay-grade-indicator variables are all zero, we would conclude that a reservist's pay grade influences his reenlistment decision in other ways than monetary compensation. Table G.1 gives the two linear probability relationships that we used to compute our F-test value.[3] The calculated value is 24.95 and 4 and 2827 degrees of freedom. This value indicates that the chances that the

[2] Franklin M. Fisher, "Tests of Equality Between Sets of Coefficients in Two Linear Regressions: An Expository Note," *Econometrica* 38 (March 1970), pp. 362-363.

[3] The discriminant function is used rather than the logit form because the F-test is predicted on a normal distribution rather than on a logistic one.

Table G.1

EFFECT OF ADDING PAY-GRADE VARIABLES USING A LINEAR MODEL

Variable	Without Pay Grade		With Pay Grade	
	Coefficient	t-Ratio	Coefficient	t-Ratio
Reserve pay and time				
Annual net drill and camp pay	0.769×10^{-4}	2.75	0.440×10^{-4}	1.70
Net reserve time	-0.116×10^{-2}	-0.72	-0.549×10^{-3}	-0.24
Reserve experience				
Pay grade E3 or below	--	--	-0.910×10^{-1}	-2.36
Pay grade E5	--	--	0.133	7.24
Pay grade E6	--	--	0.217	7.04
Pay grade E7 or above	--	--	0.449	3.35
Combat job	-0.605×10^{-1}	-3.45	-0.651×10^{-1}	-3.74
Years of service	-0.111×10^{-1}	-2.65	-0.153×10^{-1}	-3.69
Revealed reserve preferences				
Draft motivation	-0.134	-5.05	-0.125	5.33
Prior reenlistment	0.224	7.79	0.192	8.90
Civilian work environment				
Free time	0.173×10^{-2}	1.90	0.193×10^{-2}	2.15
Civilian hourly wage	-0.103×10^{-1}	-2.93	-0.126×10^{-3}	-3.64
Availability of paid overtime	-0.876×10^{-3}	-2.14	-0.894×10^{-3}	-2.22
Must use vacation	-0.534×10^{-1}	-1.19	-0.514×10^{-1}	-1.16
Employer's attitude	-0.472×10^{-1}	-5.89	-0.476×10^{-1}	-6.02
Federal government employment	0.245×10^{-1}	-0.50	-0.349×10^{-2}	-0.07
State/local government employment	0.602×10^{-1}	1.64	0.604×10^{-1}	1.67
Middle-sized firm employment	0.135×10^{-1}	0.51	0.176×10^{-1}	0.66
Small firm employment	0.453×10^{-1}	2.00	0.415×10^{-1}	1.86
Self-employed	-0.569×10^{-5}	-1.21	-0.481×10^{-5}	-1.04
Spouse's annual earnings	-0.177×10^{-5}	-0.76	-0.166×10^{-5}	-0.72
Individual characteristics				
Sex: female	0.139	2.83	0.144	2.68
Race: black	0.186	5.30	0.200	4.85
Age	0.133×10^{-1}	4.69	0.120×10^{-1}	4.30
Married	0.170×10^{-1}	0.70	-0.297×10^{-1}	-0.12
Number in household	0.118×10^{-1}	1.64	0.115×10^{-1}	1.64
Not high-school graduate	0.126×10^{-1}	0.48	0.382×10^{-1}	1.47
College graduate	-0.740×10^{-1}	-2.96	-0.922×10^{-1}	-3.73
Regional characteristics				
Middle-sized urban area	-0.194×10^{-1}	-0.67	-0.127×10^{-1}	-0.44
Small urban area	-0.279×10^{-1}	-0.94	-0.201×10^{-1}	-0.68
Rural area	-0.226×10^{-1}	-0.74	-0.138×10^{-1}	-0.45
Suburban area	0.207×10^{-1}	0.73	0.202×10^{-1}	0.73
1978/1977 local inflation factor	0.466	0.61	0.297	0.26

Table G.1

CONTINUED

Variable	Without Pay Grade		With Pay Grade	
	Coefficient	t-Ratio	Coefficient	t-Ratio
Missing value indicator (MVIV)				
Annual net drill and camp pay	-0.108×10^{-2}	-0.02	-0.254×10^{-1}	-0.56
Net reserve time	0.264×10^{-2}	0.02	0.462×10^{-1}	0.57
Draft motivation	-0.411×10^{-1}	-0.27	-0.335×10^{-1}	-0.23
Prior reenlistment	0.555×10^{-1}	0.32	0.502×10^{-1}	0.25
Free time	0.178	2.06	0.180	2.00
Civilian hourly wage	-0.860	-2.64	-0.102	-2.20
Availability of paid overtime	-0.897	-2.06	-0.751×10^{-1}	-1.76
Must use vacation	-0.291	-0.52	-0.272×10^{-1}	-0.49
Employer's attitude	-0.186	-3.33	-0.185	-3.33
Kind of employer	0.152	2.96	0.151	2.98
Spouse's income	-0.691	-1.89	-0.597×10^{-1}	-1.66
Married	0.112	1.93	0.993	1.74
Number in household	-0.407×10^{-1}	-1.20	-0.378×10^{-1}	-1.13
Education	0.437×10^{-1}	-1.13	-0.566×10^{-1}	-1.49
Residential area	-0.238×10^{-1}	-0.20	0.132×10^{-1}	0.11
Intercept	-0.229	-0.32	0.742×10^{-2}	0.01
Number of observations	2876		2876	
Mean square error		0.198		0.192
R ²		0.22		0.24
F-ratio		17.80		18.92

true values of the coefficients of all the pay-grade-indicator variables are zero is much less than 1 in 100. Pay grades appear to have a separate impact on a reservist's reenlistment decision. To fail to include our set of pay-grade-indicator variables would have meant that the estimates of the other coefficients in our basic equation could be subject to missing variable bias.

Some readers still might be interested in comparing the elasticity value of the propensity to reenlist with respect to gross reserve pay derived from our basic equation with the one derived from an equation that is identical except for the pay-grade-indicator variables. Before we can compare the elasticities we must compare the coefficient estimates yielded by the discriminant function estimates in Table G.1 with the maximum likelihood estimates from Table 11. The discriminant function estimates can be converted to a logit form. When the conversion is made, we find that we get very similar estimates. Compare the "with pay grade" estimates of the ANDACP variable coefficients in Table G.2.

Table G.2
COMPARISON OF LOGIT PAY COEFFICIENTS

Conversion for Discriminant Function ^a		Maximum Likelihood ^b
Without Pay Grades	With Pay Grades	With Pay Grades
0.394×10^{-3}	0.254×10^{-3}	0.230×10^{-3}

^aComputed from the coefficients of "Annual net drill and camp pay" in Table G.1.

^bCoefficient of "Annual net drill and camp pay" in Table 11.

The elasticity of the propensity to reenlist with respect to gross reserve pay can be computed from our estimate of the ANDCAP variable coefficients. Calculating the elasticity for the "with" and "without" cases, we see that its values increase from 0.18 to 0.31 when the pay-grade-indicator variables are removed. While this increase is large in percentage terms, the value of the elasticity remains small. The increase would not alter any of the conclusions of this report.